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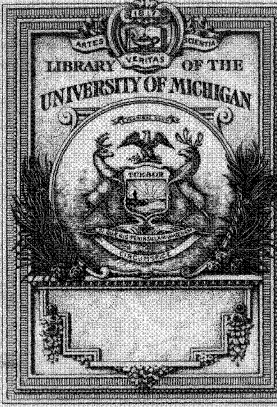
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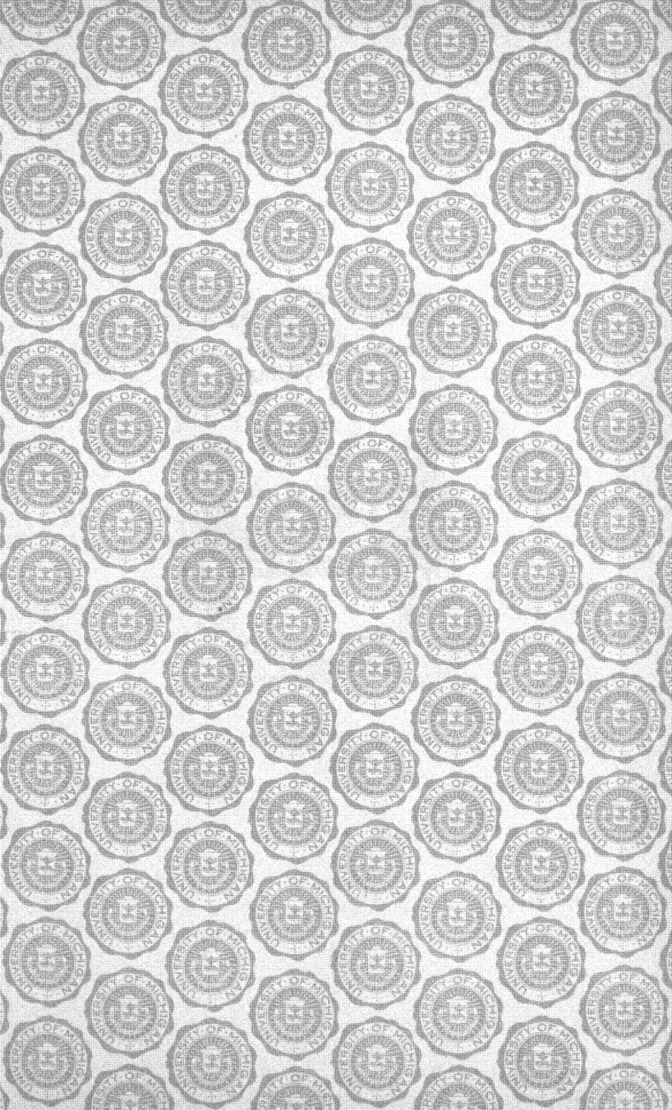

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OCCASIONAL PAPERS

OF THE

Honolulu

BERNICE PAUAHI BISHOP MUSEUM (OF POLYNESIAN ETHNOLOGY AND NATURAL HISTORY.)

VOLUME IV.

HONOLULU, H. I.
BISHOP MUSEUM PRESS.
1906–1911

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OCCASIONAL PAPERS

OF THE

BERNICE PAUAHI BISHOP MUSEUM OF POLYNESIAN ETHNOLOGY AND NATURAL HISTORY.

VOL. IV.—NO. 2.

Director's Report for 1907.

HONOLULU, H. I.
BISHOP MUSEUM PRESS.
1908.

TO THE TRUSTEES OF THE BERNICE PAUAHI BISHOP MUSEUM.

Sirs:—In accordance with the standing vote of the Trustees, I submit my Annual Report on the present condition of this Museum and the work done or planned in the various departments during the year 1907.

WILLIAM T. BRIGHAM,
Director of the Museum.

Honolulu, February 14, 1908.
Ordered printed July 10, 1908.

REPORT

WHILE it is most gratifying to a Director to report substantial gains and general prosperity of the institution in his charge, no such officer can escape the general law of changing light and shade, and he must at times recognize the fact that there are seasons when the results are not in proportion to the labor expended and not such as each member of the Museum staff has honestly and industriously striven to attain.

Such has been the year just closed. Perhaps of all the few years of the life of this Museum hitherto the one of which it must be admitted that we cannot marshal this list of accessions, that table of attendance, an increased number of workers, better accommodation for the work, or even many additional attractions for the amusement or instruction of the public.

While Mr. Otto H. Swezey has joined us as honorary Curator of Entomology, and Miss E. Schupp as Librarian, we have lost Mr. W. A. Bryan who, early in the year was reappointed Taxidermist and Curator of Ornithology for six months, this term expiring July 31st. Both our publications and our exhibition cases will suffer from the loss, and it will be difficult to fill the place of so active and successful a worker. Mr. L. G. Blackman, who has for years been a most acceptable librarian and general assistant, listened to the lure of his favorite occupation of teaching and left us to become head master of the recently founded Aliiolani College in this city. The Museum has lost strength in his departure. Mr. Hugh F. Sturtevant, who has for several summer vacations acted as Assistant, to our great satisfaction, died of typhoid fever not long after his return to his regular school work on Honokaa, Hawaii, and every member of the staff mourns the loss of a colleague and dear friend.

The Curatorship of Ornithology has not been filled, although there have been applications for the position, because with the limited income of the Museum it is impossible to fill all the positions that should be made in a museum of the size and rank of this institution, and, as much work had been done on the collection and preservation of birds until the specimens were very numerous and the portion of our library devoted to this branch was rich in the working literature of ornithology, it seemed better to turn our limited powers to some other department where a skilled worker was greatly needed, and such an one was unquestionably Botany. Not only do our valuable collections need the care of an expert, but they should be so increased that by exchange we could acquire ample specimens of the Polynesian flora on other groups, such as New Zealand, Tahiti, Samoa and Tonga. With the exception of a good collection of New Zealand ferns we have nothing from the rest of the Pacific, and as we have few, if any, botanists on this group, the Director finds great difficulty in answering the frequent requests for specimens or definite botanical information. With a competent botanist we could be of no little use to many institutions and botanical workers abroad as well as able to acquire new material in this line for our herbarium and cases. Our library should be largely increased in botanical literature, although it is already not to be despised. Still there are whole families of Hawaiian plants needing thorough study and illustration, such as the very remarkable and interesting tree lobelias so important a part of the Hawaiian flora. I had hoped to take this in hand myself and had collected much material for illustration and had prepared a few colored plates, but the pressing work of administration has hitherto made the prosecution of such a great work impossible for me, and I had thought perhaps if a suitable botanist and collector could be obtained, I might attempt to finish this task. Some one should do this, for at present the family is in sad confusion and needs ample revision and illustration. It would add greatly to the value of our publications could a monograph on the Hawaiian Lobeliaceæ be issued from our press. I have for some months been conducting negotiations looking to securing such a botanical assistant.

We also greatly need a marine zoologist, not only to work on our reefs and study the many undescribed or little known species of marine life, but to complete the grand collection of fishes which so far as shown in the admirably colored casts prepared by Mr. J. W. Thompson, our artist, greatly interest and delight our visitors, but more important still add to the known species, and increase our knowledge of species already named. As a single instance, during the past year has been added to our collection a large eel common in Samoan waters, but never before reported from these islands: nor is this a solitary case; in many other specimens in our collection of casts we have either found new species, or old species for the first time reported from these waters.

If we had the income needed to secure the additional workers we have not at present, nor do I see any immediate prospect of securing such conveniences as are necessary for their work, let alone space within the Museum walls for storage of the specimens they may be expected to add. For months I have endeavored to formulate plans which could meet the needs of such a museum as this, and after presenting to the Trustees three successive sets of plans, the second and third pared down from the preceding until the attenuation can be carried no farther and leave vitality enough in the structure to be of real use, still the funds available do not admit, in the opinion of a majority of the Trustees, of beginning to build. I do not despair, for the architect who planned the original structure of this Museum gave only a closet under the stairway (which now hardly suffices for the janitors to store their implements) for all the Museum work. Then came the cellar under Polynesian Hall, and at last the temporary wooden buildings, several hundred feet away for the Press, Taxidermy, Photography and everything else. So in the process of evolution we may attain even greater helps in our work.

With no suitable workrooms, still less any adequate storerooms at present, a condition of things which is I believe admitted by all the Trustees, the workers in the Museum cannot justly be blamed if they do not take active measures to increase the collections when we have nowhere to prepare, exhibit or store them. When they have not sufficient room apart from the public exhibition halls to unpack valuable collections already in possession; when they see valuable specimens fade away to worthlessness in the exhibition cases because they have no other place safe from insects in which to store them.

And this brings me to the consideration of one of the most important objects for which this Museum was founded,—the *preservation* of the objects collected within its walls. We have taken several important steps in that direction: a durable and essentially fire-proof building; cases as insect- and dust-proof as they can be made; a free use of preservatives, poisons and insecticides. All this is well but not enough. Certain rare specimens should no longer be exposed to the intensely actinic light of this climate but be withdrawn from public exhibition and consequent exposure, and stored for study by another generation of scientists instead of being sacrificed to the idle curiosity or unheeding gaze of the average visitor.

I had intended to place before you an analysis of what has been published by eminent museologists,—Drs. Flower, Goode, True and others on the side of work and store rooms, but our situation in the midst of the Pacific is so peculiar that even the generous allotment of work and store space by all these masters as distinct from the public exhibition halls of a museum, will hardly meet the wants of this Museum in a tropical climate, where work rooms must not be cramped and heated, and storage must be well aired and accessible. Our conditions are greatly variant from those of most large museums in cold climates where they have need of artificial heat during a portion of the year, and the winter's cold checks the activities of insect pests, while here pests of that nature are perennial and far exceeding in variety and abundance. In spite of the best of cases, collections of birds, insects, plants, must be frequently inspected, and all museum workers know that this inspection if properly done, needs room, it cannot be done in a public gallery in the presence of careless or inquisitive visitors.

I have harped so often on this string that I refrain from wearying you farther with what seems to all of us engaged in museum work the most important, and sooner or later the surely fatal defect of the Bishop Museum. I will only say that while this monument to Mrs. Bishop should be a permanent one there is little permanency about it except in the stone walls and stone implements, and to a less extent some of the wooden implements and the shells, corals and volcanic specimens. I should be recreant to my duty as Director of this Museum if I did not utter this warning. We have made too much of present exhibition for vain public gratification and have provided too little for the permanency of the treasures amassed within the Museum walls, which when perished can never be replaced.

I will not leave this subject with the impression that I do not believe a museum such as this has a part to fulfil toward the public in exhibiting to a wise extent, that is so far as by so doing it can convey instruction and even pleasure to visitors, but there is far greater good to be done to far greater numbers by such collections as ours in a very different way. They must be studied, here on the spot, by competent men, and there must be conveniences for such work. The results thus obtained will reach farther and last longer than the praises (often unmixed with knowledge) which fall from the transient visitor, however complimentary, and however pleasing to one's self-love.

Hawaiian Hall is large enough, if duplicates could be stored elsewhere, to exhibit all that any visitor of a few hours need know of Hawaiian life, human, animal, vegetable or mineral, and Polynesian Hall will do very well under the same conditions if we could separate and place in another hall somewhat larger the Papuan portion of our collection. These two halls would amply accommodate all the material we ought to exhibit or can afford to exhibit with the present income of the Museum funds. Unless we have money to buy certain private collections, we cannot get things from the Pacific desirable for exhibition in the department of Polynesian Ethnology simply because they do not exist outside collections made many years ago, and any proposed ethnological exploration of the Pacific islands must begin by securing these private collections which contain far more material for exhibition purposes than can now be collected on the islands.

I turn to the things in hand,—pleasanter matter for the earnest man than the dream of what might be if we were all wise and had command of sufficient money. We have by no means been stranded but have gone slowly on with some things to cheer us as may be seen in the appended lists of accessions. We have secured the services of a thoroughly competent entomologist in the person of Mr. Otto H. Swezey, and for the first time the collections of Mr. R. C. L. Perkins, for which the Museum contributed one-third of the cost of collecting and more than one-half the expense of publication, are being utilized and arranged for inspection by students. Under the unfortunate arrangement for the distribution of the remarkable collection of Mr. Perkins, the portion coming to this Museum of course could not include any species of which there were less than three specimens collected and so has none of the very rare ones, yet it is a sufficiently important collection to be worth all the care that we can bestow upon it.

We have also been fortunate in securing the services of Miss E. Schupp, formerly Secretary in the Seckenberger Museum at Frankfurt a/M to take charge of our well-selected and growing library. Mr. J. F. G. Stokes has not only attended to his work as Curator of Ethnology, but has been occupied with necessary work in other departments now without a head, and has done extensive work on the plans of the ancient heiau made by his own careful surveys on Hawaii.

Dr. Cooke has continued his good work on the Hawaiian land shells and has been during the year appointed Curator of Pulmonata. As he has been able to establish his laboratory in his home he has suffered less than the other workers from insufficient accommodations. He has prepared an account of the *Hawaiian Helicinæ* which is now in the hands of the Publication Committee.

Mr. J. W. Thompson has continued his admirable casting and painting of the Fishes and Fruits until the results are most valuable and interesting, and the extent of his work will be judged by the appended list of casts.

In the Library the binding of more than five hundred volumes has been completed, adding greatly to the convenience of the Museum workers, and the increase has been satisfactory as will be seen by the list of accessions. We have also added somewhat to our exchange list. An additional case has been procured for the constantly increasing cards of the Concilium Bibliographicum, a collection very valuable in this place remote from large libraries.

The Museum Press has issued only the Annual Report for 1906, but has been occupied with printing the third part of Volume II of the Memoirs, "The Ancient Hawaiian House", by the Director. It is hoped that this may be completed during the current year. Other papers have been prepared but were not ready for press during the past year.

The Deverill collection of Hawaiian ethnology which has been stored in the Museum for some time, has been finally purchased for the Museum by the C. R. Bishop Trust and will soon be incorporated with the general collection. If Mr. Deverill could have lived long enough to write his notes on the articles comprising his collection its value would have been greatly enhanced, for he was a careful observer and his knowledge of native ways was uncommonly extensive. It is intended to offer notes on some of the rarer objects in the Museum publications.

Of the very remarkable collection of Hawaiian carvings and other antiquities described in the second part of the second volume of the Museum Memoirs, two-thirds have come into our possession, that belonging to Mr. Haenisch by gift, the other by purchase, and the remaining portion is promised to the Museum and will eventually be placed in its cases. For many reasons this is one of the most interesting and valuable collections we have lately acquired, and the interest it has excited among archæologists and ethnologists abroad is shown by the call for the published account referred to.

The table of attendance of visitors shows a decrease in the total from last year of 470. The decrease of tourists continues although little more than half that of last year. The Museum has been open five more than half the week-days of the year. The average daily attendance has, for the first time since 1902, fallen below 100. The summary of attendance for 1906 and 1907 is here given and the full table follows. It may be explained that the class "others" includes Koreans, Philippinos, Hindus and Negroes.

	Whites.	Hawaiians.	Portuguese.	Chinese.	Japanese.	Others.	Totals.
1906....................	4659	1499	584	2101	2265	386	11,494
1907....................	4126	1621	548	1834	2535	360	11,024
Change from last year:	−533	+122	−36	−267	+270	−26	−470

TABLE OF ATTENDANCE.

1907.	Whites.	Hawaiians.	Portuguese.	Chinese.	Japanese.	Others.	Open on		Visitors on closed days.	Average Attendance.		Total Visitors.
							Public days.	Other days.		Public days.	Other days.	
January	261	51	22	76	142	17	9	4	20	61	5	569
February	317	120	17	611	366	21	8	6	36	177	6	1452
March	645	145	48	184	201	13	11	5	28	110	8	1236
April	310	61	58	130	156	7	8	3	33	86	11	722
May	402	173	47	160	266	21	11	4	54	92	13	1069
June	307	122	42	98	415	59	10	2	13	103	6	1043
July	321	62	52	60	240	44	9	7	90	77	13	779
August	288	86	67	115	171	26	10	5	41	71	8	753
September	336	135	45	97	121	44	9	4	14	85	4	778
October	292	183	57	83	116	18	8	3	20	91	7	749
November	401	338	79	128	200	37	10	2	3	118	1.5	1183
December	246	145	14	92	141	53	8	3	12	87	4	691
Totals	4126	1621	548	1834	2535	360	111	48	364	96	8	11,024

List of Accessions.

DEPARTMENT OF ETHNOLOGY.

Gifts.

9066 Phallic female stone. Molokai. Given by Mr. Bruce Cartwright, Jr.
9067, 9068 Two Aumakua. Hawaii. Given by Mr. F. A. Haenisch.
9069 Ipu aina. Hawaii. Id.
9070 Feather cape fragment. Hawaii. Id.
9071 Wooden funnel. Hawaii. Id.
9100–03 Fishing stones. Molokai. Given by Mr. James Munro.
9104–06 Ulumaika. Molokai. Id.
9107–10 Adzes. Molokai. Id.
9111–12 Skulls. Molokai. Id.
9114–20, 9161, 9162 Poi pounders. Hawaii. Given by Mr. C. V. E. Dove.
9641–46 Ulumaika. Hawaii. Id.
9647 Ulumaika, or bath rubber. Hawaii. Id.
9648 Ulumaika, or polishing stone. Hawaii. Id.
9649 Polishing stone. Hawaii. Id.
9650 Sinker. Hawaii. Id.
9651 Adze, broken. Hawaii. Id.
9652 Poi pounder. Molokai. Given by Mr. Levi Mahiai.
9653 "Fe", stone money. Yap, Caroline Ids. Given by Hon. H. Nanpei.

Purchased.

8719 Small kuula. Hawaiian Ids.
9072 Wooden figure, Hawaii.
9073 Ipu aina. Hawaii.
9074 Hair helmet. Hawaii.
9075 Fragment of pottery. Hawaii.
9076 Thirty boars' tusks. Hawaii.

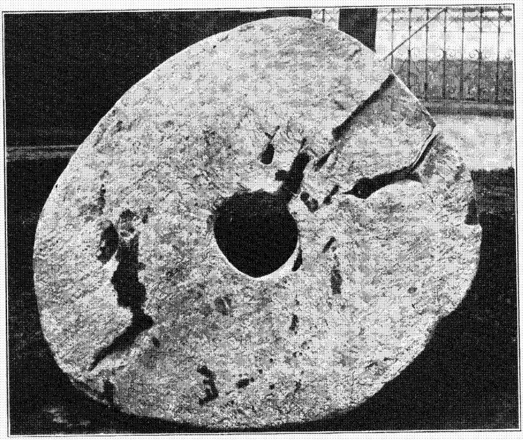

FIG. 1. STONE "FE" FROM YAP (NO. 9653).

9163 Wooden needle. Hawaii.
9164 Oloná scraper. Hawaii.
9165–70 Adzes. Hawaii.
9171 Polishing stone. Hawaii.
9172–76 Ulumaika. Hawaii.
9177, 9178 Sinkers. Hawaii.
9179 Ivory button. Hawaii.
9180 Pohaku eho. Hawaii.
9181, 9182 Sling stones. Hawaii.
9183 Stone lamp. Hawaii.
9184 Dye cup. Hawaii.
9185 Hawaiian pillow. Hawaiian Ids.
9186 Lei palaoa. Hawaiian Ids.
9187 Oloná cord and fibre. Hawaiian Ids.
9188–90 Fish hooks. Hawaiian Ids.
9191 Spear. Oahu.

Collected.

9113 Skull. Molokai. By Mr. W. A. Bryan.

DEPARTMENT OF ORNITHOLOGY.

Gift.

4711 Nest of Chlorodrepanis virens (Gmel.). Hawaii. Given by Mr. G. P. Wilder.

Collected by Mr. W. A. Bryan.

4541, 4542 Gallinula sandvicensis Streets. Oahu.
4543–49 Fulica alai Peale. Oahu.
4550–52 Gallinula sandvicensis Streets. Oahu.
4553 Actodromas acuminata (Horsf.). Molokai.
4554 Gallinago delicata (Horsf.). Molokai.
4555–66 Himatione sanguinea (Gmel.). Molokai.
4567–80 Chlorodrepanis kalaana (Wilson). Molokai.
4581–4604 Oreomystis flammea (Wilson). Molokai.
4605–18 Psittirostra psittacea (Gmel.). Molokai.
4619–26 Vestiaria coccinea Forster. Molokai.
4627–43 Phæornis rutha Bryan. Molokai.
4644 Carpodacus m. obscurus McCall. Molokai.

4645–47 Himatione sanguinea (Gmel.). Molokai.
4648 Phæornis rutha Bryan. Molokai.
4649, 4650 Vestiaria coccinea Forster. Molokai.
4651–53 Chlorodrepanis kalaana (Wilson). Molokai.
4654–57 Oreomystis flammea (Wilson). Molokai.
4658–61 Asio accipitrinus sandvicensis (Blox.). Molokai.
4662–81 Æstrelata phæopygia Salvida. Molokai.
4682–89 Himatione sanguinea (Gmel.). Molokai. Nest.
4690–95 Oreomystis flammea (Wilson). Molokai. Nest.
4696–98 Chlorodrepanis kalaana (Wilson). Molokai. Nest.
4699–4701 Vestiaria coccinea Forster. Molokai. Nest.
4702–08 Nests, unknown. Molokai.
4709 Carpodacus m. obscurus McCall. Molokai. Nest.
4710 Phæornis rutha Bryan. Molokai.
4711 Chlorodrepanis virens (Gmel.). Molokai.
4712–14 Drepanorhamphus funereus (Newton). Molokai.

DEPARTMENT OF CONCHOLOGY.

Collected by Dr. C. M. Cooke, Jr., and Acquired by Gift.

925 Lot of Pulmonata, comprising 10,000 to 15,000 specimens, from the whole group, excepting Kahoolawe.

Gifts from the following gentlemen have been acknowledged: Messrs. D. Thaanum, D. D. Baldwin, A. F. Judd, R. A. Cooke, W. F. Frear, A. F. Knudsen, C. Davis, H. Hitchcock, J. F. G. Stokes, H. M. von Holt, H. Podmore and —— Fraser.

DEPARTMENTS OF MODELING AND ICHTHYOLOGY.

Eighty casts of fish and twenty-four casts of fruits have been made, while the bodies of the fish cast have been preserved. A list of the entire collection of casts is given below.

MARINE ZOOLOGY.

A collection of deep sea corals received from the U. S. National Museum in exchange.

ADDITIONS TO THE LIBRARY.

Accessions denoted by an asterisk were acquired by exchange.

*American Philosophical Society.—Transactions, vol. xxi, pt. 4. —Proceedings, vol. xlv., nos. 184, 185.—The Franklin Bicentennial Celebration, 1906.

Anatomy and Physiology, Journal of.—Vol. xli.

Anson, George.—A Voyage Round the World in the years 1740–44. London, 1749.

*Anthropological Institute of Great Britain and Ireland.—Journal, vol. xxxvi.

Anthropological Society of London.—Memoirs, vols. i–iii, 1863–69.

Anthropologie, L'.—Vol. xvii, 5, 6.

*Anthropologie de Paris, Revue de l'École d'.—Seizième année, 10–12. Septième année, 1–2.

*Anthropologie de Paris, Société d'.—Tome xvii, fasc. 2–6; tome xviii, fasc. 1.

*Archiv für Ethnographie.—Band xvi. Leiden, 1904.

*Archivio por l'Anthropologia.—Vol. xxxvii, pt. 2.

*Asiatic Society of Bengal.—Memoirs, vol, i, pts. 10–19, and Supplement.—Journal and Proceedings, vol. ii, nos. 4–9.—Index to vol. i.

*Australian Museum.—Nests and Eggs of Birds found breeding in Australia and Tasmania, by A. J. North, vol. ii, pt. 2.—Scientific Results of H. M. C. S. Thetis, pt. 10.—Records, vol. vi, pts. 4, 5.—Report for 1906.

Beale, Thomas.—The Natural History of the Sperm Whale, 1839.

Blair and Robertson.—The Philippine Islands, vols. xlv–li. Given by Hon. Chas. R. Bishop.

*Board of Commissioners of Agriculture and Forestry (Hawaiian). Second Report.—Bull. 2, Division of Entomology.

*Boston Public Library.—Annual List of New and Important Books, 1905–6.—Fifty-fifth Annual Report, 1906–7.

*Boston Society of Natural History.—Proceedings, vol. xxxiii, pts. 5–9.

Bourge, Georges.—Les Nouvelles Hebrides, 1606 à 1906. Paris, 1906.

Brandstetter, Prof. Dr. J. R.—Ein Prodromus zu einem vergleichender Wörterbuch der Malaio-polynesischen Sprachen. Luzern, 1906.

British Museum.—Catalogue of Madreporarian Corals, vols. v, vi.

*Brooklyn Institute of Arts and Sciences.—Science Bulletin, vol. i., pts. 4–10.

Burkett, Chas. W.—Cotton, Its Cultivation, Marketing, Manufacture, and the Problems of the Cotton World. London, 1906.

*Canterbury (N. Z.) Museum Records, vol. i, pt. 1.

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*Carnegie Institution of Washington.—Year Book, 1906.—Publications, 47, 48, 54, 55, 56, 58, 59 (pt. 1), 60–72, 76–79, 81, 84, 85, 91.

*Carnegie Museum.—Memoirs, vol. ii, pt. 10; vol. iii, pt. 1.—Annals, vol. iv, pts. 1–2.—Annual Report, 1907.

Census of the Hawaiian Islands, December, 1884. Given by Dr. Wm. T. Brigham.

Cheeseman, Thomas F.—Catalogue of the Plants of New Zealand. Wellington, 1906.

Chili, Ministerio de Industria.—La Caza de la Ballena en la Isla Santa Maria.—El Karri o Eucalyptus diversicolor ila replantacion de los Cerros aridos del Paes.—I Como defendernos contra los Creces de los Rios?—La Reproducion Forestale. Los Servicios de Aguas i Bosques.—El Cultivo del Olivo en Cerros secos.

*Cincinnati Museum Association.—Twenty-sixth Annual Report, 1907.

*Connecticut Academy of Arts and Sciences.—Transactions, vol. xii, vol. xiii, pp. 1–297.

Department of Commerce and Labor.—Report, 1907.—Documents, 621–623.—Statistics of Fisheries New England States.

Dittmar, Wilhelm.—Te Tohunga.—Alte Sagen aus Maoriland.

Dresden.—Bericht über die Verwaltung und Vermehrung der Königlichen Sammlungen für Kunst und Wissenschaft. 1904–05.

Erskine, J. Elphinstone.—Journal of a Cruise among the Islands of the Western Pacific. London, 1853.

Expedition to Torres Strait.—Vol. ii, pts. 1, 2; vol. v.

*Field Museum.—Publications: Botanical, vol. ii, 4, 5; Geological, vol. iii, 4, 5; Zoological, vol. vi, vii (1–4), vol. viii.—Report series, vol. iii, 1.

Fiji.—Official Handbook. 1892.

Froggatt, W. W.—Australian Insects. Sydney, 1907.

*Geelong Naturalist.—Vol. iii, 1-3.

Geographical Journal.—Vols. xxv-xxviii.

Haack, Dr. Hermann.—Geographen Kalendar, 1907.

Hagen, Dr. B.—Types of Heads and Faces of the East-Asiatic and of Melanesian people.

*Harvard University Library.—Ninth Report, 1906.

*Hawaii Agricultural Experiment Station.—Bulletins, 14-15.—Press Bulletins, 19-20.

Hawaiian Entomological Society.—Proceedings, i, 1-4.

Hawaiian Forester.—Current numbers.

*Hawaiian Sugar Planters Association.—Report and Year Book, 1906.—Division of Agriculture and Chemistry: Bulletin 20, Circulars 2-5.—Division of Entomology: Bulletins, 3-5, Circulars 2-8.—Division of Pathology and Physiology: Bulletins 4-5, Circulars 5-6.

Hawaiian Tariff. Given by Dr. Wm. T. Brigham.

Ibis, The.—Eighth Series, vol. v. 1905.

Icones Bogorienses.—III, 2.

*Indian Museum.—Annual Report, 1905-06.—An Account of the Alcyonarians collected by the Investigator in the Pacific Ocean.

*Instituto Geológico de Mexico.—Boletin 22, 24.

*Italiana d'Antropologia, Società.—Archivios, vol. xxxvii, 1.

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Dartmouth College. Hanover, New Hampshire.
École d'Anthropologie de Paris.
Field Museum. Chicago.
Free Museum of Science and Art. Philadelphia.
Geological Survey of New South Wales. Sydney.
Gordon Technical College. Geelong, Australia.
Harvard University Library. Cambridge, Mass.
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Hilo Public Library. Hawaii.
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Museu Paulista. Sâo Paulo, Brazil.
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Museum National Hongrois. Budapest.
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Oahu College. Honolulu.
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University of Kansas. Lawrence, Kansas.
University of Pennsylvania. Philadelphia.
U. S. Experiment Station. Honolulu.
U. S. Geological Survey. Washington, D. C.
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A List of Casts of Hawaiian Fishes

MADE BY JOHN W. THOMPSON OF THE MUSEUM STAFF.

IN all cases where possible the original of the cast has been preserved. A number of casts of fish not yet determined with certainty should be added to this list in summing up the number. The figures after the names represent in inches the length of the cast from snout to tip of tail, and the fish are from Honolulu unless otherwise noted.

Sphyrna zygæna (Linn.). Hammer-headed shark. Mano kihikihi. 33.5.
Casts of two young sharks, species not determined. 23, 35.
Stoasodon narinari (Euphrasen). Spotted Sting-ray. Hihimanu. Body only. 20.5.
Albula vulpes (Linn.). Bonefish. Oio. 24.
Chanos chanos (Forskal). Milkfish. Puawa. 28.5.
Trachinocephalus myops (Forster). Welea. 10.
Saurida gracilis (Quoy & Gaim.). Ulae. 10.5.
Synodus varius Lacépède. Ulae. 12.
Congrellus (sp.). Conger Eel. Puhi. 62.
Microdonophis fowleri Jordan & Evermann. 26.
Gymnothorax laysanus (Steindachner).
Echidna zebra (Shaw). Puhi. 45.
Sphagebranchus flavicaudus Snyder. 16.
Eleven undetermined species, mainly Gymnothorax.
Aulostomus valentini (Bleeker), three distinct colors. Nunu. 28.5, 22.7, 14.7.
Tylosurus giganteus (Schlegel). Ahaaha. 32.
Athlennes hians (Cuv. & Val.), (2). 41, 44.5.
Euleptorhamphus longirostris (Cuvier). Iheihe. 18.7.

Exocœtus volitans Linn.; also young. Flying-fish. Malolo. 12.7, 6.7.
Mugil cephalus Linn. Mullet. Amaama. 20.
Sphyræna snodgrassi Jenkins. 32.7.
" helleri Jenkins. Kawaleá. 17.
Polydactylus sexfilis (Cuv. & Val.). Moi. 20.
Holotrachys lima (Cuv. & Val.). 5.
Ostichthys pillwaxii (Steindachner), (3). 10, 10.4, 10.5.
Myripristis chryseres Jordan & Evermann. Pauu. 8.5.
Flammeo sammara (Forskal). 8.7.
" scythrops Jordan & Evermann. 8.5.
Holocentrus spinifer (Forskal). 18.5.
" ensifer Jordan & Evermann. 12.7.
Xiphias gladius Linn. (cast of head only). A'u.
Scomber japonicus Houttuyn.
Auxis thazard (Lacépède). Frigate Mackerel.
Gymnosarda pelamis (Linn.).
" alletterata (Rafinesque). Bonito. Kawakawa. 16.
Germo germo Lacépède. Albacore. Ahi. 56.
Ruvettus pretiosus Cocco (2). Walu. 44.
Promethichthys prometheus (Cuv. & Val.). 13.4.
Lemnisoma thyrsitoides Lesson. Hauliuli puhi. 37.7.
Scomberoides toloöparah (Rüppell). Lae. 24.
Seriola (sp.). 28.
Decapterus pinnulatus (Eydoux & Souleyet). Opelu. 18.
Carangus ignobilis (Forskal). Pauu'u. 36.5.
" elacate Jordan & Evermann (2). 32.
" melampygus (Cuv. & Val.). Omilu. 15.
" rhabdotus Jenkins.
" helvolus (Forster).
Caranx speciosus (Forskal). Paopao. 21.
Carangoides ferdau (Forskal).
" gymnostethoides Bleeker. 19.
Alectis ciliaris (Bloch). Ulua kihikihi. 4.5.
Collybus drachme Snyder. 7.7.
Coryphæna hippurus Linn. Dolphin. Mahihi. 61.
Kuhlia (sp.).
Amia maculifera (Garrett). 3.7

Amia menesema (Jenkins). 5.4.
Epinephelus quernus Seale (2). 11, 5.4.
Odontanthias fuscipinnis (Jenkins). 8.
Priacanthus alalaua Jordan & Evermann. Alalaua. 7.4.
" cruentatus Lacépède. 16.5
" meeki Jenkins (2). 13.7, 19.2.
Rooseveltia brighami (Seale). Ukikiki. 16.5.
Aphareus flavivultus Jenkins (2). 19.5.
Aprion virescens Cuv. & Val. Uku.
Etelis marshi (Jenkins), (2). Ulaula. 21.5, 15.
" evurus Jordan & Evermann (2). 38, 38.5.
Monotaxis grandoculis (Forskal). Mamamu. 9.
Mulloides auriflamma (Forskal). Weke ula. 14.
Pseudupeneus chryserydros (Lacépède). Moano kea. 10.
" multifasciatus (Quoy & Gaim.). Moano. 8.
" chrysonemus Jordan & Evermann. 7.2.
" porphyreus Jenkins. Kumu. 15.7.
Upeneus arge Jordan & Evermann. Weke. 15.5.
Dascyllus albisella Gill (2). 3.7, 4.
Chromis ovalis (Steindachner). 7.2.
Pomacentrus jenkinsi Jordan & Evermann. 3.5.
Abudefduf abdominalis (Quoy & Gaim.). Maomao. 7.7.
" sordidus (Forskal), (2). Ku pipi. 5.
Malacanthus parvipinnis Vaillant & Sauvage. Maká'a. 11.
Lepidaplois albotæniatus (Cuv. & Val.). A'awa. 5.2.
" strophodes Jordan & Evermann. 4.5.
Verreo oxycephalus (Bleeker). 25.5.
Halichœres ornatissimus (Garrett). Ohua paawela. 5.2.
Gomphosus varius Lacépède. Aki lolo. 5.
" sandwichensis Günther. Hinalea iiwi. 6.5.
" tricolor Quoy & Gaim. Hinalea iiwi. 9.
Anampses evermanni Jenkins. Opule lauli. 11.5.
Thalassoma purpureum (Forskal). 14.7.
" fuscum (Lacépède. Awela. 10.5.
" duperrey (Quoy & Gaim.). 9.
" aneitense (Günther). 5.5.
Julis pulcherrima (Günther). Hinalea loló. 8.7.

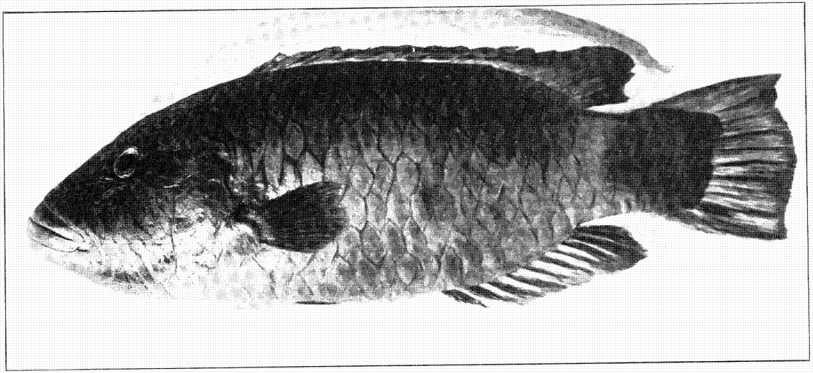

FIG. 1. CAST OF CHEILINUS HEXAGONATUS GUNTHER. 18.2 IN.

Julis lepomis (Jenkins). 17.2.
“ eydouxii Cuv. & Val. 14.2.
Coris ballieui Vaillant & Sauvage. 9.2.
“ venusta Vaillant & Sauvage. 6.2.
Cheilio inermis (Forskal), (4). Kupoupou. 7, 11.5, 14, 16.
Pseudocheilinus octotænia Jenkins. Aleihi lakea. 18.7.
Cheilinus hexagonatus Günther (2). Poou. 12.5, 18.2. See Fig. 1.
Novaculichthys woodi Jenkins. 5.7.
“ tæniourus (Lacépède). 10.5.
“ kallosoma (Bleeker). 4.
Cymolutes lecluse (Quoy & Gaim.). 6.7.
Iniistius pavoninus (Cuv. & Val.). 4.7.
“ niger (Steindachner). 5.7.
Xyrichthys niveilatus Jordan & Evermann. 10.5.
Calotomus irradians Jenkins. 19.5.
Three undetermined species.
Scaridea zonarcha Jenkins (2). 9.2, 11.7.
Callyodon perspicillatus (Steindachner). Uhu uli uli. 18.7.
“ jenkinsi (Jordan & Evermann). 14.
“ lauia (Jordan & Evermann). Lauia. 9.7.
Two undetermined species.
Forcipiger longirostris (Broussonet). 7.
Chætodon setifer Bloch. 6.7.
“ lunula (Lacépède), (2). Kikakapu. 2.7, 5.7.
“ unimaculatus Bloch (2). Kikakapu. 4, 3.5.
“ punctatofasciatus Cuv. & Val. 3.6.
“ miliaris Quoy & Gaim. 5.2.
“ trifasciatus Mungo Park. 5.
“ ornatissimus Solander. 4.7.
“ quadrimaculatus Gray (2). 5.4, 5.
“ fremblii Bennett. 5.5.
“ ephippium (Cuv. & Val.). 6.
Microcanthus strigatus (Cuv. & Val.). 5.
Heniochus acuminatus (Linn.). 6.2.
Holocanthus arcuatus Gray. 7.
Zanclus canescens (Linn.). Kihikihi. 6.2.
“ ruthiæ Bryan. 2.7.

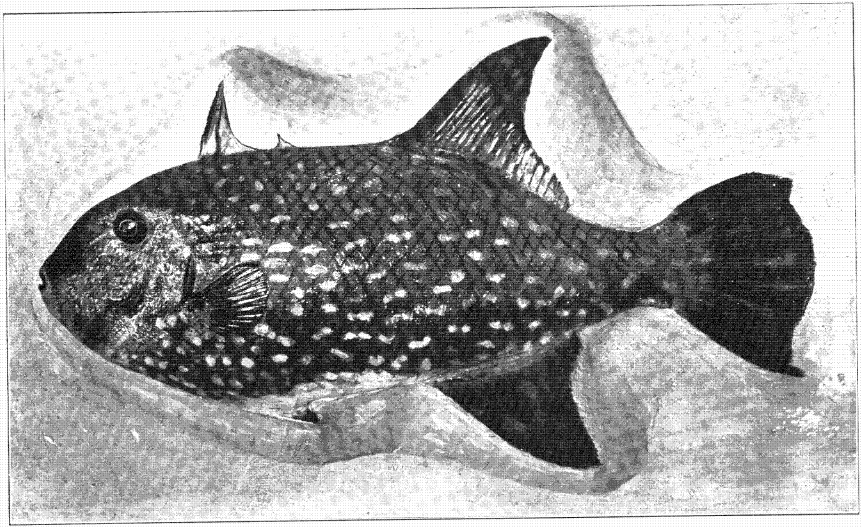

FIG. 2.—CAST OF CANTHIDERMIS MACULATUS BLEEKER. 11.5 IN.

Hepatus achilles (Shaw). Pa kui kui. 7.
" dussumieri (Cuv. & Val.). 17.
" xanthopterus (Cuv. & Val.). Walu. 23.
" guttatus (Bloch & Schneider). 10.5.
" atramentatus (Jordan & Evermann). Maiko. 7.
" sandvicensis (Streets). 8.
Zebrasoma veliferum (Bloch). 7.
" flavescens (Bennett). Laipala. 2.3.
Acanthurus unicornis (Forskal), (2). Kala. 25, 8.
" brevirostris (Cuv. & Val.), 28.5 to tip of horn, and young. 8.5, 30.5.
Callicanthus lituratus (Forster). 13.
Balistes nycteris (Jordan & Evermann). 5.7.
" vidua Solander (2). Humuhumu uli. 4.5, 10.4.
" bursa Lacépède. Humuhumu lei. 7.5.
Balistapus rectangulus (Bloch & Schneider). 8.4.
" aculeatus (Linn.), (2). 4.6, 10.7.
Canthidermis maculatus Bleeker. 11.5. See Fig. 1.
Melichthys radula (Solander). Humuhumu eleele. 11.
Cantherines sandwichiensis (Quoy & Gaim.). 12.
Stephanolepis spilosomus (Lay & Bennett), (2). Oili uwiwi. 2.5, 5.6.
Osbeckia scripta (Osbeck). 25.2.
Tetraodon hispidus Linn. (3). Keke. 4, 10.5, 13.
Two species undetermined.
Canthigaster cinctus (Solander). 4.
Ranzania makua Jenkins. Makua. 23.
Ostracion sebæ Bleeker. Moa. 5.4.
Lactoria schlemmeri Jordan & Snyder. 11.5.
Cheilodactylus vittatus Garret (2). Kikakapu. 9.5, 12.5.
Paracirrhites forsteri (Bloch & Schneider). Piliko'a. 7.
" arcatus, (Cuv. & Val.). Piliko'a. 4.7.
Cirrhitus marmoratus (Lacépède). Oopukai. 10.
Sebastapistes corallicola Jenkins. 4.5.
One undetermined species. 3.
Pterois sphex Jordan & Evermann. 6.
Scorpænopsis cacopsis Jenkins. 14
" gibbosa (Bloch & Schneider). Omakaha. 17.5.

Iracundus signifer Jordan & Evermann. 4.2.
Peristedion engyceros (Günther). 11.5. Lahaina.
Cephalacanthus orientalis (Cuv. & Val.). Lolo-oau. 10.5.
Osurus schauinslandii (Steindachner). 4.6.
Eleotris sandwicensis Vail. & Sauv.). Oopu. 4.6.
Brotula marginalis Jenkins. 11.
Platophrys pantherinus (Rüppel). 7.
One species not determined. 4.6.
Antennarius leprosus (Eydoux & Souleyet). 4.2.

Two hundred and fifty-three casts in all.

Stone Sculpturings in Relief from the Hawaiian Islands.

By John F. G. Stokes.

A stone bearing a remarkable pair of petroglyphs was, a few years ago, ploughed up at a place called Puu o Ma'o on the cliff forming the eastern side of Moanalua valley, near Honolulu, and after being taken to the house of the owner, Hon. S. M. Damon, was photographed with that gentleman's kind permission.

The stone is an irregularly shaped piece of rather finely cellular basalt, measuring 31 inches long, 21 wide and 17.5 thick, the face of which has been carefully worn down by hammering with a stone or dull metal instrument, leaving the representations of two human figures in relief (fig. 1, *b* and *a*) the outer surface of which formed part of the original surface of the stone. The workmanship in the two figures differs in regard to care of execution, which is probably due to the fact that fig. 1, *a*, was nearer completion, and, being in higher relief than the other, this would allow greater scope to the dull tools applied. The area enclosed by the bodies, arms and thighs of both figures and the arm and chin of fig. 1, *a*, is higher than the surrounding plane. The sculptured surface might thus be likened to a zincotype well routed out. This would seem to be due to the deficiencies of the tools used.

The height of relief of fig. 1, *a*, varies somewhat, being at finger tip 1.1 inches, between chin and hand .8, chin 1.4, back 1.8, buttocks 2, foot .1 to .3, knee 1.3, between knee and elbow .6, belly .8. The measurement from head to foot is 11.8 inches. In this figure a piece has been recently broken out of the arm, leaving a scar running from the finger to the elbow; but it is still perfectly clear that the hand had only three fingers. It is also evident that an attempt was made to represent the juncture of the wrist and hand by a narrow cross ridge. A comparison with the conventionalized hands of the Maori carved figures might not be out of place. The portion representing the face has been symmetrically chipped away on both sides leaving a blunt ridge running from the forehead to the upper lip without any distinctive mark to indicate the nose. At the angle of the cheek a piece has been gouged out to represent the eye. The chin has not been worked down and stands higher in relief than the upper lip. The mouth has been chipped at an angle. The head is joined to the shoulder directly above the armpit by a narrow flattened ridge, back of which is a shallow groove. The portion from the parietal region to the middle of the back has not been finished, as is apparent from the slope of the stone and the rough pits remaining (figs. 1 and 2). The shoulder is in higher relief than the head. The back as far as finished is well rounded. The buttocks are curved well under the figure. There was hardly enough material to carve the whole foot in relief, but a very prominent heel was left. The length of the foot traceable is 2.3 inches. The knee is represented by a straight cut 1 inch long. The edge of the belly was finished at a right angle,

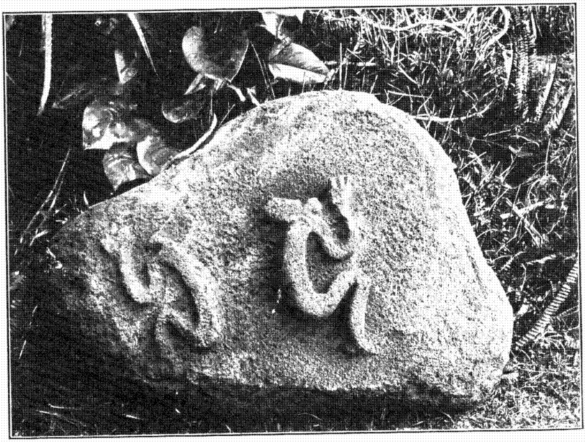

FIG. 1.

probably by rubbing. The surface of this figure is as smooth as the rough lava would permit, and undoubtedly this effect has been produced by the same process.

Figure 1, *b*, measures 10.2 inches from crown to toe; the height in relief at back is .8 inch, and at belly .5. Unfortunately the outer part of the head has been recently broken off, but sufficient remains to show that there was no mouth. In contrast with fig. 1, *a*, this head was set firmly on the body. The chin is very angular. The hand appears to have only two broad fingers, wide spread, but probably it is unfinished. The foot is clearly shown in the photograph and is 2.2 inches long. The edge of the belly was squared and the other parts rounded. The carving was nowhere carried under the figure as in *a*. The surface is rough, and has probably not been rubbed. No doubt this figure is incomplete.

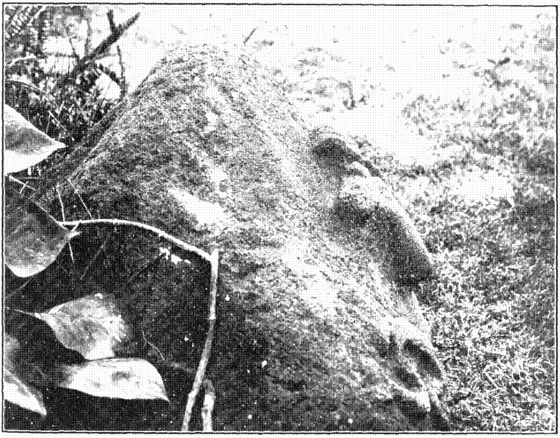

FIG. 2. BACK VIEW OF *a*.

That the sculptures were made in these islands there can be little doubt. Though the stone has not been chemically analyzed, it is of a kind very common at Moanalua, forming a stratum four or five feet thick in the cliff of that valley. It might be surmised that the work was done with stone tools[1] from the pittings on the unfinished portions. Even were a dull metal instrument employed, it might be expected that the pittings would be deeper and that there would be evidence of an occasional glancing blow. It might be mentioned that the numerous imitations of stone idols seen in these days show nothing of the care with which these figures have been carved. The land where the stone was found was uninhabited from the middle of last century until about 1891 (when Mr. Damon's dairy was installed). There is one point yet to be cleared up. Mr. John Cullen, Mr. Damon's rancher, employed two men to prepare the small piece of land for planting, and a number of stones were dug up and used to fence the land, the stone in question, for some reason unknown, being left in the field. These men have since left the country. After their departure, Mr. Cullen, a staunch North Briton, seeing the stone in the field and wondering why it had not been placed in the wall with the others, made an examination and found the sculpturings. If ever the two men are heard from, more may be learned concerning the details of the discovery.

Before accepting the petroglyphs as of Hawaiian conception, it would be well to consider the carving in profile, the squatting position and the detail of the limbs, which place these figures in a class apart from the Hawaiian petroglyphs so far discovered. The native wooden images were carved with a close attention to detail. The stone idols mostly consist of a crudely carved face at the end of a stone, but on all the Hawaiian idols observed, the nose was distinct. In fig. *a* there was sufficient space for the artist to carve a nose in place of the low ridge by which he indicated the central line of the face. In this respect fig. *a* calls to mind the figures on the Marquesan bone carvings and wooden stilt rests. The Rev. Wm. Ellis gives an illustration[2] of a wooden idol with a long head and similar features, which was secured by Rev. John Williams in Rarotonga. Edge-Partington and Heape[3] figure another one, accredited to the same island, but it is doubtful how much consideration should be given these resemblances.

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[1] An illustration of shaping poi pounders by chipping with pebbles may be seen in Mem. B. P. B. Mus., vol. i, p. 375, fig. 39.

[2] Polynesian Researches, London, 1830. Vol. ii, frontispiece, upper right hand corner.

[3] Ethnographical Album, first series, plate 23, fig. 6.

The carving in profile and position of the limbs of the petroglyphs seem to find close analogy to a figure carved on stone and seen at Orongo, Easter Island, by Mr. W. J. Thompson.[4] This figure was perhaps another form of the god Meke-meke[5] which Mr. Thompson says was the most common figure carved at that part of the island. However, an examination of the numerous tablets illustrated in the plates accompanying Mr. Thompson's work will show a character, with variations, closely resembling the former figure, which, from the freqency of its occurrence, might be considered as a representation of a human form portrayed in various acts. Among the Maori carvings, birds and lizards are found in profile, but the conventionalized human figure is always presented with full face, even when the body is seen in profile.

The squatting position of the figures is not uncommon in Polynesia, as seen in these islands, remarked by the missionaries at Tahiti,[6] by Melville[7] at Nukuhiwa, and by Rev. Wm. Ellis[8] at Huaheine.

The sculpturing in relief has already been observed on two Hawaiian stone lamps, one of which was recently purchased by this Museum with the Deverill collection (fig. 3), and the other, with a similar figure on one side only, was seen by the writer in 1900 on board a small local steamer which was wrecked a few days later. However, these figures have no other resemblance to those at present under discussion. The Bishop Museum is in possession of two stone fish gods with carvings of fish in relief. One, from the Deverill collection, represents a human head, with the face very well made and the neck shaped like a fish tail, the whole giving the suggestion of a round-bodied fish. At the back of the head a smaller fish two-thirds the length of the whole, has been carved in relief. The length of the idol is 8.5 inches. The second fish god is a thick stone roughly triangular in plan, with top and bottom flat and sides perpendicular. The top has been worked down at the edges for about an inch, leaving the shape of a deep flat-bodied fish, nine inches long. The material in both these specimens is a very hard compact lava.

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[4] Te Pito te Henua, by Paymaster William J. Thompson, U. S. Nat. Mus. Report for 1889, p. 481, fig. 7.

[5] Ibid, fig. 8.

[6] Missionary Voyage of the Duff, London, 1799, p. 77.

[7] Typee, New York, 1876, pp. 74 and 257.

[8] Polynesian Researches, London, 1830, vol. ii, pp. 209 and 210.

Returning to the first subject. It is evident that the work was done here from the fact that it is unfinished, apart from the improbability of such a heavy stone being transported in canoes. The stone is comparatively soft and would not weather well, though being buried in a comparatively dry soil, it might last indefinitely. From its incomplete state and the fact of its burial, it might be argued that it was being carved at the time of the abolition of the tabu in 1819, and that the sculptor hid it for preservation during the general destruction of idols which followed. This concealment of images by their devoted attendants has been the means of preserving many valuable specimens to the present day.

Seeking the significance of the figures—it is not yet understood if the various Hawaiian petroglyphs are to be considered in the light of a written language. The natives belonging to Moanalua now living had not seen the stone, and the best explanation the oldest inhabitant could give was that the figures represented the mythical giant lizard, "Moo", which was ever present in native superstitions. The same suggestion has been made by natives from other islands of this group, but only from appearances.

A first glance at the figures would suggest two human beings in the act of prayer, but the older natives consulted, do not associate this position with that taken by Hawaiians engaged in the old forms of prayers. They describe several postures—depending on the nature of the prayer—standing, on hands and knees, on elbows and knees with forehead resting on the hands, sitting with legs and hands folded, also sitting with legs to one side and hands on the ground. In all these positions, they say that the head should be hung. The observant Ellis[9] when at Huahine, noted some of the positions taken by the southern Polynesians in prayer, and remarked: "The petitioner did not address the god standing or prostrate, but knelt on one knee, sat cross-legged, or in a crouching position, on a broad flat stone, leaning his back against an upright basaltic column, at the extremity of a smooth pavement, usually six or ten yards from the front of the idol." A little later on,[10] referring to his request of an old blind priest at Parea, Huahine, for a repetition of one of the ancient prayers: "After great persuasion, he consented, and assuming the crouching position, or sitting as it were on his heels, he commenced...."

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[9] Polynesian Researches, London, 1830, vol. ii, p. 209.

The writer is indebted to Dr. Brigham for the suggestion that the figures represent two people asleep, the position of the head following naturally the use of a hard pillow.

The idea that the figures represent deities appeals to the writer more than that of their being intended for mortals, following the claim of two old natives, who asserted that the figures must be gods since their faces looked upward. It is not to be expected that the Polynesian would expend the amount of arduous labor required to carve these figures so carefully, for any other than a sacred purpose, and the position of the arms and heads, indicating the act of eating or drinking, calls to mind the stories told of the offerings to the gods and spirits of deified ancestors, of food, but especially drink in the form of awa, which the gods were believed to have consumed. Were the stone found on the shore instead of a mile inland, it could be reasonably concluded that the figures were intended for Kuula, the fish god, and Hina his wife, whose names are generally linked together. These gods were worshipped at every fishing ground and in any convenient form, from a shapeless boulder to a well carved image.

Figure 3 shows a side and two end views of a stone lamp of basalt (No. 9338) purchased from the estate of the late W. E. H. Deverill, of Kauai. Unfortunately no history of the circumstances pertaining to its discovery have been preserved, but there are two recent abrasions on the outer surface, which might well indicate that the specimen was found when ploughing—a frequent means of discovery of many valuable stone implements in these islands. The upper edge of the lamp has been broken off to a depth varying from one-half to one inch, but the break is an old one as is shown by the soot clinging to the broken surface. The inner portion is heavily coated with soot. The Hawaiian lamps have been described already by Dr. Brigham,[11] but the cup in this lamp differs from that in other specimens in the Museum both in size and shape. The usual form has a roughly cylindrical hole, with bot-

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[10] Ibid, p. 210.

[11] Mem. B. P. B. Mus., vol. i, pp. 391-398.

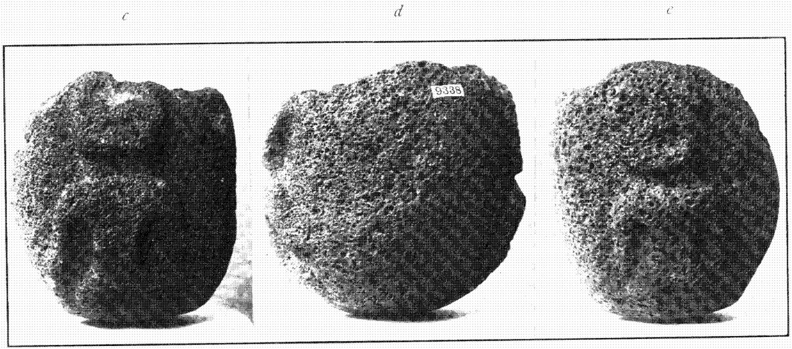

FIG. 3. SCULPTURED STONE LAMP.

tom more or less flat, sometimes varied with another small pit in the middle. The cup in specimen No. 9338 is ovately conical, with a diameter of 2.8 to 3 inches at the edge and a depth of 3.5 inches. In this specimen, the greater outside diameter is 7.4, lesser 6.4 and height 6.6 inches. A raised figure of human form adorns each end, each 6.3 inches high. The noses are in evidence, while to represent the eyes and mouths, there are slight depressions. Small projections represent the ears. The legs are very short and are without feet. They were gradually worked down and disappear at the edge of the convex bottom of the lamp. The lower portion of the arms of fig. *c* are bent out a little to represent hands, and are seen more clearly in fig. *d*. In fig. *c* the breadth of shoulder is 3 inches, and the height in relief .8 inch, while in fig. *e* the measurements are 2.8 and .7 respectively.

The use of the human figure in native art as a means of ornamenting utensils occurred among the higher castes of Hawaiians, as is evidenced in some wooden bowls and dishes preserved in this and other museums. In regard to the intention of the carving being merely ornamental, a legend has been handed down with specimen No. 408 in this Museum to the effect that the figures supporting the dish represented Kahahana, the king of Oahu (conquered and slain by Kahekili of Maui) and his wife Kekuapoi-ula, who were shown in the carvings in the menial position of offering food and holding their mouths wide open as salt cellars.[12] It might reasonably be believed that the dish was the work of a Maui artist with the idea of degrading the memory of the vanquished Oahu king. The custom of honoring or dishonoring the memory of the deceased by the use of human teeth and bones inlaid in implements, has been referred to by Dr. Brigham.[13] We might regard the figures ornamenting the stone lamp under discussion as representing persons in native history destined by the art of the sculptor to guard the lamp for all time, but whether as an honorable occupation or a menial task, we cannot decide.

This specimen of native stone work is probably unique, the only other lamp of like workmanship known, having been lost as before narrated.

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[12] Mem. B. P. B. Mus., vol. ii, p. 162.

[13] Ibid, pp. 368, 369, pl. xxxi.

While the following may not be apropos of the subject of this paper, it is submitted with the hope that it may be of use in locating the debated site of the human bone fence or house known as ''Kaualua''. There is an old native of Moanalua, aged 88, who has lived at Kalihi, a neighboring valley, for the past twenty-five years. From the old man's descriptions and the writer's measurements it appeared that the stone described in the first part of this article was found immediately near the Kaualua. The coincidence the writer thought might be of value as a clue to the significance of the petroglyphs. As the old native was very feeble, the writer awaited an opportunity when he should feel strong enough to drive to Moanalua and point out the exact spot where the Kaualua stood. This proved to be 700 feet away from the place where the stone was found, which fact the writer considered was sufficient to remove any probability of connection between the two. The native's opinion could not be shaken, and suggestions of other sites had no influence with him. The surveyors in these islands have found the Hawaiians invaluable in pointing out old boundaries in the former complicated land system, and it is generally conceded that the native testimony on land matters is reliable. The old man's story will be told in its sequence.

Fornander[14] gives the following in connection with the massacre of the Oahu people by Kahekili, king of Maui, after the conquest: ''It is related that one of the Maui chiefs, named Kalaikoa, caused the bones of the slain to be scraped and cleaned, and that the quantity collected was so great that he built a house for himself, the walls of which were laid up entirely of the skeletons of the slain. The skulls of Elani, Konamanu, and Kalakioonui adorned the portals of this horrible house. The house was called 'Kauwalua', and was situated at Lapakea in Moanalua, as one passes by the old upper road to Ewa. The site is still pointed out, but the bones have received burial.'' Fornander's account does not agree with the story told by the Moanalua natives today, which is repeated as briefly as possible: ''Kalaikoa was chief of the district, lived right by the old highway where it crossed the cliff, and occupied himself by waylaying the travelers and killing them for the purpose of getting their bones to build a fence around his house. He was secure from reprisals, as he had a strong body of soldiers at his call. After killing his victims he extracted the long arm and leg bones and planted them upright in the ground to make a low palisade. Retribution overtook the bloodthirsty chief, for when he had the fence completed, except for the bones of one man, he died, and his bones were used to fill the gap."

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[14] A. Fornander, Polynesian Race, vol. ii, London, 1880, p. 226.

Lapakea is in the valley, about 500 feet away from the cliff. Were all details known today, the two versions would probably be found to fit together, except in regard to the bone "house". The old man's story agrees with the last, except that he says that the bones of two men were needed to complete the fence when Kalaikoa died. He had seen the fence, and the following details were gleaned on the spot: The fence was composed of the leg and arm bones placed erect in the ground as close together as the fingers when relaxed. They were not tied. There was a single line of fence, making a square enclosure, one side of which was fifty feet (paced). In this enclosure was a large stone platform on which the grass house had stood, but there was no house standing when he first saw the place. Well outside the enclosure, 60 feet to the south, was a small house, built entirely of stone, into which the remaining portions of the murdered bodies were put. He had seen the bones there himself. The house was not an *imu* (underground stone-lined oven) but of proper house shape, large enough for the body of a man. The road passed between this and the fence.

This house the old man spoke of as a "heiau" dedicated to the war god Kaili. It had walls three feet high and four feet wide, with a pitched roof of stone and a door facing the bone fence. Outside the door was a stone pavement, where the priests gathered.

As pointed out, the Kaualua was in the land of the same name close to the boundary of Puu Kapu. The land of Kaualua is a small piece on the plateau about 600 feet wide between Puu Kapu and Puu o Ma'o. The boundaries of the various small sections were named for the writer's edification as they were passed. The site of the Kaualua is now occupied by a well built private road and was found at the place where the road passes over a subway used as a cattle drive.

The description given by Peter Corney[15] in 1818 of a bone fence on Oahu, although not specifying the locality, is probably a true account of the Kaualua, as there has been no mention of more than one such place in the islands. "In my tour with Mr. Manning (Manini), we visited the ruin of a large stone house, or fort, which had formerly belonged to a great chief; it had a double fence of human bones around it; these were the bones of his enemies killed in the war before the islands were visited by Europeans. The bones of this great chief are said to be still in the house; the natives are afraid to go near it, preferring to go a round of five or six miles to passing it." The road to Pearl Harbor, whither Captain Corney was bound, passed through the land of Kaualua at that time.

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[15] Peter Corney, Early Northern Pacific Voyages. Edited by W. D. Alexander. Pp. 114 and 115. Honolulu (T. G. Thrum), 1896.

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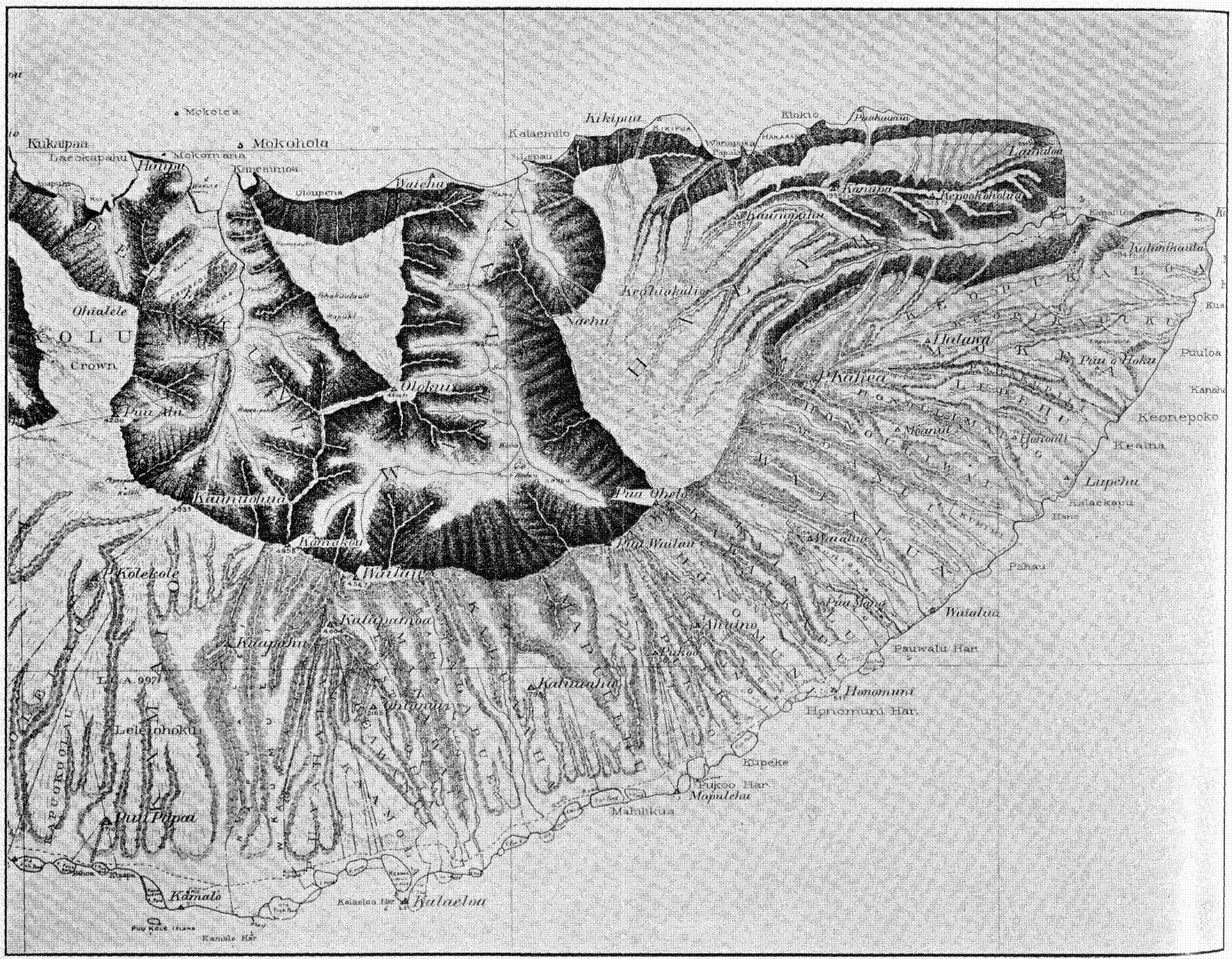

EASTERN END OF MOLOKAI. FROM GOVERNMENT MAP.

Some Birds of Molokai.

BY WM. ALANSON BRYAN.

WITH a view to securing suitable material for the series of Hawaiian bird groups being assembled in the Bishop Museum, the writer spent two months (April 15 to June 15, 1907) collecting in the mountains of Molokai. The collecting of the skins and the necessary material required in the Museum's work afforded a favorable opportunity for making some detailed field observations on the nests and habits of many of the birds found on this seldom visited island. In addition to a general report of the expedition, the Molokai Olomao (*Phæornis rutha*) is herein described as new and shown to be a species closely allied to *P. lanaiensis* with which it has formerly been united.

The popular and, in a large degree, the scientific interest in the expedition centers about the securing of specimens of the Hoa or Black Mamo (*Drepanorhamphus funereus*) which is one of the rarest of living birds. The search of the forests was made with a view to securing specimens of this species if possible. As a consequence the collecting of other mountain birds was in a sense incidental to this main endeavor. Locating the present haunts of the few remaining examples of the Hoa, made frequent change of station necessary, and, as a result, practically the whole forest area of the island was visited before the coveted locality was finally found. The most extended stay, however, was made at Kamoku camp, and it was at this place that most of the material here reported was obtained.

Kamoku camp is a shelter cabin belonging to the Molokai ranch. It is located on the southwest side of Hanakalilolilo mountain, near the head of Waikolu valley, and it is well suited to the requirements of the collector. It is about 4000 feet elevation and on the edge of the great bog forest at the head of Waikolu and Pelekunu valleys. In this vicinity have been secured most of the specimens of birds of the island, now in museums. The region is also important as the type locality for the Hoa and certain other birds peculiar to Molokai.

The second camp was at the eastern end of the island near the mountain Kaunapahu and beside one of the many streams which unite to pour their waters into the head of Halawa valley. From this station trails were cut through to Wailau valley and then extended to the left to reach the centre of the Halawa headwater country—a region which had never been thoroughly explored.

The third, and in many ways the most successful camp, was made back of Moanui ranch, near the head waters of the Waialua stream. The fourth and last station was directly back of Mapulehu, within a short distance of the pali of Wailau valley. From all of these stations, as centres, excursions were made in various directions. By reference to the map it will be seen that the forested eastern half of the island, which is the portion of greatest interest to the ornithologist, was accessible from the stations mentioned. From the different camps referred to I was able at least to visit all of the favorable localities, while the more important collecting grounds were very thoroughly explored.

What has been said elsewhere[1] of the difficulties attending the collecting of birds in the mountains of the Hawaiian group is especially true of the mountains on Molokai. Indeed it is impossible in a brief description to give an idea of a region so varied and broken, representing, as it does, all the main features of a wild semi-tropical forest and a group of volcanic mountains combined.

For various reasons the wet bog forest at the head of Waikolu and Pelekunu valleys is conceded to be the most difficult collecting ground in the Hawaiian Islands. It is situated at a sufficient elevation to be drenched by almost continuous rains, and as a result the verdure is always most luxuriant. Under foot, at all times, is a perfect quagmire up to one's knees. Overhead the tangle of vines, aerial roots, ferns, bushes, and standing and fallen trees—all completely overgrown with moss and slime—are so woven together as to produce an almost impenetrable jungle. Great palis drop down perpendicularly for hundreds of feet. Narrow, fissure-like, forest-hidden valleys, running in all directions, add to the difficulty of getting about, while numerous vine-covered well-like holes, often a hundred or more feet deep, play no small part in furnishing an ever present source of real, though hidden, danger to one working in the region. Add to all these and a hundred other material things the discomforts of the cold drenching rains, the dripping forests, and the dense—oftimes bewildering—clouds of fog that envelope everything, and there would seem to have been little omitted that would add to the discomfort of the collector.

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[1] Notes on the Birds of Kauai, Bryan and Seale, Occ. Papers B. P. B. Mus., vol. i. no. 3. p. 129. Notes on the Birds of Waianae Mountains, Bryan, Ibid, vol. ii, p. 235, etc.

The Halawa district is even more discouraging to the naturalist. The country—an otherwise sloping plain—is cut into long sharp ridges by numerous, almost countless, streams and tributary ramifying valleys, all converging to pour their waters down Moaula and Hipuapua falls, into the beautiful Halawa valley. Throughout this headwater region Ieie (*Freycinetia*) vines run rampant. The trail must be cleared of them at every step. Splendid trees are so overgrown and completely hidden by them that when one looks over the forest from a point of vantage there is little else than ieie in sight. The difficulties and mishaps incident to carrying a gun and working one's way for days through such a snarl can be better imagined than described. It is not uncommon for one to be forced to abandon the ground entirely, and to climb for considerable distances over the bushes and low trees; often one is twenty feet or more from the ground, on top of the tangle of vines. To find the small and inconspicuously colored birds after they have dropped to the ground through such a maze is a task of no mean proportion: often hours of fruitless labor can be thus expended.

Though less boggy than Pelekunu, and less overgrown with vines than Halawa, the stations at Moanui and Mapulehu each presented physical obstacles to the collector that are, in their way, almost as difficult to surmount. Among them might be mentioned the long narrow ridges and impassable waterfalls at Moanui, and the precipitous palis of Wailau and Mapulehu.

In general it may be said that the forests of the island are characteristically timbered with the common native trees of the group, save for the striking exception of the Koa (*Acacia*) which is entirely wanting in the Molokai mountains. The Ohia (*Metrosideros*) is everywhere the most conspicuous, and, to the ornithologist, the most important tree. Wild banana (*Musa*), several kinds of the large lobelias, the Kopiko (*Straussia*), Olema (*Perrottetia*), and a number of other trees, are common in the higher ranges, while Kukui (*Aleurites*) is an abundant species in the valleys and on the lower ridges, where, as in the valleys on the windward side, it grows to an immense size.

As elsewhere in the group, the timbered area is now more limited in extent than formerly. That this reduction in area has worked a hardship on the avifauna throughout the islands is well known. However, on Molokai more than anywhere else, has the change in the forest and its inhabitants been allowed to come about naturally, through causes inherent in the fauna and its habitat. For this reason, fairly reliable testimony, even of a meagre nature, concerning the existence and subsequent disappearance of certain birds, before the introduction and spread of foreign plants, animals, or conditions, is of great interest. It may be regarded as suggesting what would probably have occured in time from innate causes existing in the fauna or its environment, even though the introduced causes with which we are familiar, had never become active. As a matter of fact, the impending extermination of certain Molokai birds cannot, in any just way, be attributed to introduced disturbing conditions. In certain other cases, however, it would seem to be entirely due to conditions brought about since the coming of the white race.

The weather throughout the trip was, I am told, unusually wet and cold. Heavy rains were of almost daily occurrence, while cloudy, gloomy weather was almost continuous. This not only interfered with collecting, but caused many birds to abandon their nests—often after they had been completed, and I had marked them for study.

For much of the success of the trip the writer's, as well as the Museum's, thanks are due to the directors of the Molokai ranch for many special courtesies and privileges. I wish personally, to make especial acknowledgment of the kindness and hospitality extended by Messrs. James Munro, C. C. Conradt, O. Tollefson and C. E. King.

LIST OF BIRDS.

Micranous hawaiiensis (Roths.).

A few examples were seen at sea off the Wailau side of the island. There is a cave on the coast between Pelekunu and Waikolu, through which it is possible to row a canoe at low tide, that is used by this species as a nesting and roosting place. Although I did not visit the cave, I am reliably informed that the thousands of little Hawaiian Tern or Noio make this their home.

Æstrelata sandwichensis Ridgw.

Œstrelata sandwichensis Ridgway, Water B. N. Am., ii, p. 395 (1884).

Although the Uau is to be seen at the proper seasons on the channels between the various islands of the group, and has for generations been hunted by the Hawaiians for food, not to mention its having long ago been made to figure in a very popular legend of the natives, it has continued to remain one of the rarest of the Hawaiian birds in museum collections.

Up to the present, save for an immature specimen in the Bishop Museum that was collected by Mr. Henshaw on the beach at Hilo, in 1900, the species has been known only from a skin "from the Sandwich Islands" in the U. S. National Museum (No. 61,259), collected by Mr. V. Knudsen, and a second specimen taken by him on Kauai, now in the British Museum. It is, therefore, with considerable satisfaction that I report on a fine series of adult skins which I secured on Molokai during the month of June.

On April 26, while at the residence of Mr. John Walker, in Pelekunu valley, I was shown, in a cabinet of curiosities, a roughly mounted specimen of the Uau. The bird had been collected by Mrs. Walker three or four years before the time of my visit, one morning, asleep in the long grass on the hills back of the village, and not far from Mrs. Walker's house. The specimen was kindly given to me for examination. The following morning, at an early hour, I heard a solitary bird calling from high up on the cliffs near the village where I had spent the night. I at once made an effort among the natives to organize an Uau hunt. They all agreed that it was not the proper season for securing birds, saying that it would be useless to make the severe climb up the mountain to where the birds' nests were. Some weeks later, they assured me, Uau would be much more plentiful. As it is impossible to find the birds' burrows without specially trained dogs, which only the natives have, I was forced to give up the project for the time being.

My next meeting with the Uau was on May 9. I was on a two day camping trip on the Kaunuohua trail, which leads down the pali into Pelekunu valley. The object of the trip was to spend a late evening and early morning in that locality, in the hope of hearing the call, and, if possible, secure specimens of the Oo, since the bird, in former times, frequented that section. On the way down, at about a 3500 foot level, I found the bill, wings, feet and some loose feathers of an Uau that had been killed and eaten by some animal, presumably a mongoose, not more than the day before. That night I went into camp beside the trail in a drenching rain. The camp was not an elaborate affair, simply a few ieie vines and ferns piled on a narrow shelf on the pali, the ledge being scarcely wide enough to lie on. The face of the pali was almost perpendicular for hundreds of feet above and below me. In fact, it was so steep that it was necessary, as a precaution, to drive stakes along the lower side of my bed to prevent the possibility of its slipping off the edge and my rolling off during the night.

Shortly after dark I began to hear the strange, weird cry of these petrels, as they sailed about the cliffs, evidently attracted by, and much exercised over, my campfire. All night long—long after the fires had died out—they could be heard calling here and there about my "swallow nest" camp. A long drawn out U–a–u, suggesting the wail of a lonesome cat, would be answered by Uau–ka–ka–ka–ka–ka, a note just petrel enough to be recognized as such, yet combining such a number of other suggestive sounds, as to render it both indescribable and unforgetable. Though they frequently flew close to me, there was so much heavy fog that it was useless to shoot in the dark, besides it would have been almost impossible to have secured a bird from the precipice below me if it had been killed by a chance shot. The experiences of the night, however, were enough to assure me that the petrels were about in sufficient numbers to warrant an effort to secure specimens, when I could manage the undertaking.

For the next few days following my Pelekunu experience with the birds, I was camped at Halawa and Moanui. At the former place, although far from any habitation and in a rugged country, I did not hear nor see a single Uau. At Moanui, on the other hand, they were seen each evening at dusk flying over the headlands close down beside the sea. Three specimens were taken June 5 and 6. It is rather curious that all the birds seen flew along the coast toward the east, against the wind, while later on, on the windward side of the island, the birds were seen to return to their rookeries from all directions. A possible explanation would be that the birds prefer to follow along coast line to their nesting places on the opposite side of the island, rather than to take the more direct route over the mountains through the fog.

A favorable opportunity for visiting the nesting colonies of the Uau did not come until June 14, when I made a trip down into Wailau—the valley lying next east of Pelekunu—for that especial purpose. On the way over the pali from Mapulehu, about half way down the Wailau trail, a half-eaten carcass of one of these birds was found, under similar conditions to the one noted from Pelekunu valley.

At Wailau village I rallied a party of these experienced native bird catchers, with their Uau dogs, for a day's hunt on the almost vertical cliffs of Olokui. For there, well down towards the sea end of this great pyramid-shaped mountain, at an elevation between 3500 and 4000 feet, a colony of these birds have reared their young each season for generations. Each year, during the summer months, the natives of the valley have formed hunting parties and have preyed upon the colony in search of the young Uau, which are regarded as an especial delicacy by all Hawaiians.

Our start was an early and auspicious one. My men were each provided with a bag which was held on the back, suspended from the shoulders, in approved native fashion. Save for my collecting gun, we were without firearms and unencumbered. The day was bright, with occasional showers—just sufficient to keep every leaf in the moss-grown forest soaked and dripping. Only the most hardy and venturesome natives ever attempt this climb. For four hours we struggled up the steep ascent, cutting the trail through the tangled undergrowth, helping each other up the cliffs where footholds were wanting, pulling ourselves up by our hands here, slipping back there, passing the dogs over the dangerous places, encouraging them over the hard ones, panting, wringing wet, and all but exhausted, we at last reached the top where the crest of the ridge slopes down a few hundred feet before it pitches off for a perpendicular drop to the floor of the beautiful balloon-shaped valley two or three thousand feet below. The crest of the ridge, here as elsewhere, is overgrown with the usual jungle of vines, ferns and trees which hide the steep, broken—often dangerous—irregularities of the rocks which it covers.

For the next six hours we ranged over the mountain side, each of us following as best he could, some one of the dogs. Over the cliffs and down the valleys they ran in every direction, sniffing here, digging there, until finally on locating a bird they would bark for help.

Digging out an Uau is not the easy and pleasant task one might imagine. As a rule they make their burrows under the spreading surface roots of trees—sometimes going back under them several feet from the mouth of the burrow. Occasionally they select a crevice in the broken rock or underneath a boulder that is overgrown with roots and vines, so as to resemble, in its essential features, the site just described. Rarely—almost never—are they found nesting on the surface of the ground, even though it be covered with vines and undergrowth. Having located the burrow and opened it up for a distance, it is often then difficult to find the bird, for the holes are usually natural ones that follow the roots in various directions, and at most are only appropriated by the bird and modified to its use. But once the hand touches the bird there is no further doubt concerning its whereabouts, for on being disturbed they bite with their hooked, pincer-like bills, and kick and scratch with their feet most savagely. Once the bird is in hand it is easily despatched by the native hunter in a neat and efficient manner. The forefinger is violently forced down the bird's throat. It is then slightly bent at the first joint so as to catch the heart and lungs, which are given a slight twist and sharp pull, with the result that the bird dies instantly, with scarcely a struggle.

One can with practice, imitate the Uau's call very closely. This ruse was continually resorted to by the natives. Their efforts would occasionally be answered by some unwary bird, thus disclosing its whereabouts, but as a rule they failed to respond. Earlier in the season, during the actual mating, the call is more generally given and answered by the birds throughout the day, but by the time of our visit the birds were mated and sitting together in the burrows. On several occasions two birds were pulled from the same burrow. Later on, I was informed, when the single glossy white egg is laid, it is a common occurrence to find one or the other parent birds sleeping outside the burrow, while its mate sits on the nest within.

July is given as the time when the egg is laid. The young in the downy stage, are always taken in late September and October. October 10 is the day usually selected by the natives as the most favorable time for collecting the downy young. These are commonly pulled from the holes by means of a stick which is split at one end. The split end is twisted into the down of the bird and in this manner it is easily pulled forth. But the adults must be captured and dragged out by the hand. As has been said, the young birds are especially prized as food. In former times they were reserved for the chiefs alone, being tabu to the common people.

As a result of the day's expedition, twenty-one Uau were taken, eighteen of which were made into skins. Compared with former years, this was a very unsatisfactory bag. In June, 1906, the same men, with the same dogs, and with much less effort, secured sixty-three birds. The cause in the decrease in numbers was not far to seek. Along the trail, as we ascended Olokui, we found the remains of three birds that had been killed and eaten by mongoose. It was a common thing when following the dogs, to have them lead us to deserted burrows, the occupants of which had been devoured but a few feet from their homes. In one hole we found a female mongoose with a flourishing family of five little ones, that had taken possession of an Uau burrow after its occupant had been killed. From the foregoing data, when taken in connection with the wide distribution of the mongoose in the group, it seems certain that the Uau is doomed to rapid extermination.

Turning to the series of eight males and twelve females, all in the full adult plumage, I am impressed by the remarkable uniformity of color and size exhibited by it. A table showing the maximum, minimum and average measurements of the series is given, the measurements being in inches. The culminicorn is measured from the anterior end of the nostril to the tip of the bill.

EIGHT MALES.

	Wing	Tail	Tarsus	Toe	Culmen	D. of B.	Culminicorn
Minimum	10.85	5.20	1.30	1.80	1.17	.55	.90
Average	11.04	5.33	1.34	1.85	1.21	.55	.90
Maximum	11.15	5.40	1.40	1.90	1.25	.58	.90

TWELVE FEMALES.

	Wing	Tail	Tarsus	Toe	Culmen	D. of B.	Culminicorn
Minimum	11.00	5.25	1.30	1.70	1.17	.53	.85
Average	11.15	5.33	1.34	1.82	1.21	.55	.91
Maximum	11.40	5.40	1.40	1.85	1.25	.57	.95

The average length of both sexes is about 15.50. A June female of its nearest relative, *Æstrelata phæopygia* Salvin, from the Galapagos Ids., in the Museum's collection, measures: wing 11.85, tail 5.50, tarsus 1.45, toe 2.00, culmen 1.35, depth of bill .62, culminicorn .96. The measurements of a series of birds from the Galapagos, as given by Rothschild (Avifauna of Laysan, etc., p. 290), is "wing from 11.6 to 12.50, averaging from 11.8 to 12 inches, tail 5.8 to 6.3 and 6.4, metatarsus about 1.4 to 1.5."

It will be noted that the Museum's specimens from the Galapagos, with the exception of the tail, falls well within the average, as quoted from Rothschild. The specimen may, therefore, be taken as a representative of that series. Since it is a June specimen, it is specially useful in comparison with the Molokai series.

In comparison, it will be seen that in all maximum dimensions, the Hawaiian birds fall safely below the minimum given for the Galapagos series, but nowhere is this difference more noticeable than in the size and form of the beak. This difference, though marked, is difficult to describe, but it may be stated definitely that in *sandwichensis* the bill is much more slender, the nail more strongly deflected at the tip, and the nostrils thinner and less prominent. These differences are constant throughout the Molokai series. The color characters are even more obscure. However, the slaty black terminal bands on three or four of the shorter auxiliaries forming a patch on the side of the body under the wings in Galapagos specimens are entirely wanting in all Hawaiian specimens in the Museum; even the immature bird from Hilo beach. In *sandwichensis* the white frontal band is wider and the black bases to the white feathers composing it do not reach to the base of the beak, as in *phæopygia*. The whole back and wings are blackish slate, with the feathers of the mantle inconspicuously, if at all, marked, with paler tips (not slate black with conspicuous whitish terminals as in *phæopygia*). The outer pair of tail feathers, viewed from above, vary somewhat, but they are always in both adult and immature birds, strongly mottled with white on their inner, and to some extent, on their outer webs.

I regard *phæopygia* and *sandwichensis* as distinct, though closely allied species with the latter possessing characters of color, measurement and habitat sufficiently marked to distinguish it from the former in all ages and both sexes. I, therefore, adopt Ridgway's name as published in the text of the Water Birds of North America (vol. ii, p. 395, 1884) as the proper designation for the Uau (not Uuau as sometimes erroneously given), or Hawaiian Dark-rumped Petrel.

Puffinus newelli Henshaw.

Unfortunately, I did not secure a specimen of this rare bird, though I had the pleasure of examining one that had been preserved by Mrs. Wilson. It had been collected some years before, from one of the steep cliffs toward the summit of the mountain between Pelekunu and Waikolu valleys. The description taken from it accords exactly with a specimen in the Museum collection from Kauai. The bird is known on Molokai as Ao—the name being an imitation of its nocturnal cry. Pelekunu natives informed me that during the "bird season", early in October, the adults and young can be collected in considerable numbers from the cliffs. They were quite clear as to the distinguishing characters between the Uau and the Ao; giving differences which an unobservant person would have passed over. Therefore, I have every reason to have confidence in what they told me concerning their habits. They assured me that some birds were seen, or rather heard, throughout the year (?), but that they became plentiful about the first of May. From that date on all through the summer months, they would hear them each night call out "A-o", as they left their burrows to fly out to sea. They were commonly found colonized in the steepest parts of the pali, 500 or 1000 feet or more from the floor of the valley. The Uau as a rule, have their colonies higher up, seldom less than 1500 feet above the sea. Occasionally, however, both birds are found in the same colony—on rare occasions in the same hole. The Wailau natives who accompanied me on the Uau hunt just described, verified these statements. They were at some loss to account for the absence of Ao from among our catch of Uau, since last year, in June, they got both species. I heard the call of the Ao in the two valleys mentioned several times, but am convinced that it is much the rarer of the two birds.

Phaëthon lepturus Lacep. & Daun.

From the cliffs at the heads of the principal valleys, in fine weather, we can always see one, sometimes five or six, of the White-tailed Tropic Bird or Koae, gracefully floating about the cliffs far below. While no specimens were secured, I had no difficulty in satisfying myself that only the white-tailed species frequent the precipices there. As yet the bird is fairly common, being noted on a number of occasions, at different places about the island. However, it has already begun to suffer from the depredations of the mongoose, which is known to be on the increase everywhere on the island, especially in such localities as the Koae favors for breeding places.

Fregata aquila Linn.

The Iwa was seen on two occasions a considerable distance out at sea. Specimens are shot from time to time when they fly in close to the beach.

Anas wyvilliana Sclater.

No specimens of the Hawaiian duck were seen, and I doubt very much if there any now living in the island. Several persons informed me that some years ago it was always to be seen in the streams—frequenting the pools high up in the mountains. Lately they have disappeared. Doubtless the few pairs that in the past have found a congenial habitat along the streams at the Halawa end of the island have been preyed upon by the mongoose.

Nycticorax nycticorax nævius (Bodd).

On May 30 I shot an adult male Auku Kohili from a tree beside the Honouliwai stream well up into the mountains. The bird is not common at the higher elevations—only two or three being seen there. But towards dusk, on the beach, especially at Moanui and Mapulehu, they were common flying from the valleys to fish from the walls of the mullet ponds along the coast.

Mr. O. Tollefson's son relates that while he was returning from the mountains one day along the Honouliwai stream, he saw at some distance ahead of him an Auku sitting on a rock in the stream, evidently still-hunting for fish. As he was watching the bird a mongoose came out of the shrubbery along the stream and pounced on the solitary fisherman. The bird and the animal engaged in a desperate struggle, resulting in the death of the Auku before the boy could interfere. Although he gave immediate chase, the mongoose succeeded in dragging its prey from boulder to boulder out of the stream and into a crevice in the rocky bank, from which it was impossible to dislodge the animal.

Gallinula sandvicensis Streets.

This species is common on the island, being seen in the taro ponds in Wailau, Pelekunu and Halawa valleys.

Fulica alai Peale.

I did not find the Alae keokeo, but am told that it is to be seen on the mud flat at Palaau, a locality I was not able to visit.

Himantopus knudseni Stejn.

The Kukuluaeo or Hawaiian Stilt is a resident species at Palaau where the young have been taken in June.

Lophortyx californica (Shaw).

The California Quail is common, though not abundant, on Molokai, frequenting the open country on the western end of the island. The mother birds were being followed by their half-grown young in May.

Phasianus torquatus Gmel.

The Ring-necked Pheasant is a well established introduced species on Molokai.

Phasianus versicolor Vieill.

Like the last, the Japanese Pheasant is common on the island. Both species keep to the open country or the edge of the forests, seldom, if ever, entering the deeper woods.

Spilopelia chinensis Scop.

The Chinese Turtle Dove is occasionally seen in the deepest native forests, though it is more commonly found nesting in the introduced Algaroba (*Prosopis*) along the coast about Kaunakakai. There is but little rice or grain of any kind raised in Molokai, hence the dove does not find as congenial a habitat there as on Oahu for example.

Asio accipitrinus sandwichensis (Blox.).

In the Director's Report for 1904 (Oc. P. B. P. B. Mus., vol. ii, p. 241) I published a note on the nesting habits of the Pueo. To the data there given I am now able to add a third date for the nesting period of the Hawaiian Owl. While moving my camp into the Halawa headwater region, well back of Hipuapua falls, on May 24, I found a nest of the Pueo, in a swaile which had formerly been a large wild banana patch, three or four acres in extent. My guide was in advance and stepped directly over the mother-bird without noticing her. Fortunately, the bird did not take flight, and I was able to catch her in my hand as she crouched on the nest. The nest contained one recently hatched young, and five lustreless white eggs, all of which were well advanced in incubation.

The young bird was not more than a day old. It was covered with very short, fine, creamy buff down, and looked very helpless and comical. The nest itself was unpretentious in the extreme, being simply a few dry spears of grass and a dozen feathers from the parent's breast, not enough, all told, to keep the eggs off the wet boggy ground. Beside the nest was a half-eaten rat.

The adult, young and eggs were taken and left that night at the camp. The following day, during my absence, a mongoose found the eggs on top of a wood-pile shelter, where I had left them temporarily, and destroyed them all. The parent-bird was in very worn plumage, and measured: wing 11.90, tail 4.50, culmen 1.10, tarsus 1.40. The young birds have now been taken from the nest on November 20, 1901, March 6, 1905, and May 24, 1907. These widely separated dates indicate that the Pueo nests at any time that suits its convenience. It is more abundant in Molokai than any other island of the group I have visited. In favorable localities it is to be seen each evening, sometimes as many as half a dozen at a time, flying about in search of food.

Alauda arvensis Linn.

The Skylark is now common on the grass lands of the island. Frequently as many as six or eight birds are in sight at a time as one rides or walks through the most favorable localities. The mongoose seems not to have interfered seriously with the nidification of this introduced songster, owing, no doubt, to the fact that it nests in the open field far away from any cover that would harbor this avowed enemy of all ground nesting birds.

Acridotheres tristis (Linn.).

The Mina is thought to be less numerous than in former years. If true, it may be due to the dying out of the lantana on the islands, since it is known to feed voraciously on the berries of this plant. Birds were seen about our camp at Kamoku, always keeping to the open fringing woods. At Halawa, however, they were seen further into the interior, but at no great elevation. Nowhere were they observed in conflict with the native birds. They are indeed so seldom seen in any numbers in the regions frequented by our native birds, that they can hardly be said to seriously affect the decrease or disappearance of the Hawaiian avifauna.

Carpodacus mexicanus obscurus McCall.

The House Finch or "Rice Bird" is common on Molokai. A nest—one of a number seen—was taken from an Ohia tree growing near Kamoku cabin at about 4000 feet elevation. It had been deserted, owing to the heavy late rains. The seeds in the grass, of which it was composed, had sprouted, some of the sprouts being two inches long, giving the structure the appearance of a ball of pale green moss.

Munia nisoria (Temm.).

The "Chinese Sparrow" was occasionally met with in small flocks on the lower levels about the island.

Drepanorhamphus funereus (Newton).

The Hoa, or "Oo-nuku-umu" as Perkins calls it, is exceedingly rare, so rare, indeed, that seven weeks of continuous field work in the forests of Molokai, its only habitat, were necessary before seeing or hearing, let alone securing a single specimen. The species was brought to our knowledge by Mr. Perkins, who first secured specimens in the forests at the head of Pelekunu valley in 1893. Judging by the number of specimens in the Bishop Museum, which received one-third of all the specimens he collected, not more than six birds were secured by him. The following year Mr. Theodore Meyer, a resident of Molokai, secured six specimens from the same locality, in six months of more or less continuous collecting. He believed the species to be extinct, as neither he nor any of his friends from then until now had been able to find the bird in any locality.

In March and April of the present year, Mr. George Munro spent four weeks in the type locality, with especial information as to its habits and calls, furnished him by Mr. Perkins. As Mr. Munro has had considerable experience in collecting Hawaiian birds, having accompanied Mr. Palmer on his expedition through the group, the fact that he did not find the Hoa added great weight to Mr. Meyer's opinion that since 1894 the bird had become extinct.

After spending three weeks in the woods about Pelekunu, having had the advantage of Mr. Perkins' notes, and Mr. Munro's experience, I left the Kamoku camp satisfied that there was scarcely a hope of finding even a chance specimen in that section. It seemed certain too, that unless the birds could be found in some one of two or three similar localities on the island, there could be but little doubt but that it had vanished from the Hawaiian forests forever. During the next ten days especially devoted to a search for the Hoa and the Oo, in the Halawa mountains—in a section probably never before hunted over, or perhaps never even visited by white men—under forest and climatic conditions suited to both species, I was unable to locate either of them, and quit the region thoroughly discouraged and disheartened.

The next attempt was made at Moanui ranch. Since it was here, and here only, that I secured specimens, a fuller account of the experiences of this part of the expedition will be of interest, as showing some of the difficulties attending the work in these mountains, as well as the character of the country in which a few Hoa still survive. After settling my camp at the Moanui mountain house on the morning of May 30, I set off alone up Honouluwai valley, that being regarded by Mr. Tollefson and his men at the ranch, as probably the most feasible way of getting back into the mountains. No one, to their knowledge, had reached the head of the stream; in fact, the mountainous part of the ranch was *terra incognita* to the owner of the ranch, and everyone else, for its back boundaries had never been surveyed, or even visited. By picking my way over the boulders in the bed of the stream and working around the small waterfalls, I made fairly rapid progress until late in the afternoon, when I came on a small waterfall where the stream poured over a steep ledge, twenty-five feet or more in height. On either side of the stream the solid rock ran up almost perpendicularly for three or four hundred feet. The only way to proceed seemed either to turn back and leave the stream entirely, or to scale the falls itself. Judging by the character of the country and similar experiences elsewhere, it seemed probable that the stream from this point on would be a series of more or less impassable waterfalls. Desiring to satisfy myself on this important point before returning for the day, I stripped off all my wearing apparel, save a stiff-brimmed rain hat, swam across the pool at the foot of the falls, and started to pick my way up the slippery rock over which the water poured. When three-fourths of the way up, my hands and feet suddenly slipped from under me. Coming down violently on my arm and side, and falling in such a way as to strike my head a stunning blow on a projecting rock, I rolled back into the pool of cold mountain water in an almost helpless condition. Fortunately, I was not completely stunned by the blow on my head, owing to the protectton afforded by the stiff brim of my hat. I was severely bruised as it was, but the shock of dropping backward into the pool revived me sufficiently to enable me to escape drowning. However, it took some time after I had pulled myself out of the water, to regain my strength. The mishap was a sufficient adventure for the day, and an experience that will never be forgotten.

After a day or so of rest, I had sufficiently recovered from my injuries to resume the quest. On inquiry, a native boy was found, who felt sure he had been beyond the falls where my unpleasant mishap had occurred. He was accordingly engaged as guide. By nine in the morning, we had arrived at the place where I had fallen into the pool. Without further delay my boy went two or three hundred yards down the stream and began to pick his way with great caution up along the side of the cliff on the Moanui side of the valley. After great exertion, and with much difficulty, in the time of which my guide got a fall which lamed him considerably, we at last got above the falls, and down into the stream again. Within ten minutes of the first falls, we found a second one that had been completely hidden from sight and sound by the first one encountered. It was seventy-five feet high, and poured over the ledge at a place that completely blocked the way, making further progress along the watercourse quite impossible. We could now hear the roar of another and still larger falls, only a little way on. The only thing remaining for us to do was to turn back and work our way up the Moanui side of the valley. This was exceedingly difficult to do. After five hours of the most laborious climbing, we at last, by two o'clock, made the crest of the ridge and could look down into the valley below. From where we stood one could have thrown a stone into the stream we had left, so nearly vertical was the rock wall we had scaled. From this point we kept on the ridge, cutting our trail a considerable distance into the mountains before night came on. On our return to camp late that night, we abandoned the stream entirely and opened a new trail down the main ridge.

Owing to the injuries resulting from his fall, my boy was unfit for duty the following day. In his stead an old, well informed mountain-going native was engaged. By an early hour we were at the farthest point reached the day before. For six hours, in the rain and fog, through a tangle of ieie and uhi (Smilax) vines, over, through, and under the moss-covered trees and roots, we forced our way still further up the ridge into the interior. It was the most uncomfortable sort of weather, and taken altogether it was exceedingly disagreeable, disheartening work. All day long we had not seen a single bird that could not have been collected in an hour's time by patiently waiting under any one of the flowering ohia trees we had passed by in the early morning on our way up the trail.

In the middle of the afternoon, I took the trail knife to give the old guide a chance to rest, for he had been chopping on the path since early morning. We were working in a particularly dense and unpromising jungle of ieie, when I heard a clear, gentle, even, inquiringly whistled "H-o-a" called by some bird not more than fifty yards away. It was a moment of intense excitement. There was little doubt in my mind but that the note was that of the bird I had so long sought. Making signs to the native to hurry to me with the gun, I began to imitate the whistle call as best I could. To my delight the curious black bird with the wonderfully curved bill, the object of my seeking, flew down and lit in a tree within ten feet of me! It was evident that curiosity aroused by my chopping had brought the bird to the spot to investigate.

Actively hopping and flitting from limb to limb, scarcely stopping a second, eyeing me sharply all the while, it persisted in keeping so close to me that I could not with safety fire even my auxiliary barrel. Yet the restlessness of the bird made it apparent that I must fire soon or lose my chance, for if the bird got fifty feet from me in the tangle of trees and vines on the side of the ridge, it would, in all probability be gone from sight and forever. I pulled the trigger and, to my consternation my gun missed fire. It was after all little wonder that gun and ammunition failed me, for both had been soaking wet for three days. The next few seconds were moments of painful indecision. To break and reload my gun would surely frighten the bird; to use the heavy charge in the left barrel was almost criminal, but my only recourse. Without further delay I availed myself of the first opportunity when the bird was screened by limbs and fired. The feathers flew: my first Black Mamo had been shot. Shot, but not found. "A bird in the hand" in the Hawaiian forests, is worth several in the bush, especially the bush in Molokai. Though the bird was not more than twenty-five feet from me when I fired, and my man and I both saw it start to fall, we searched for it in vain for three-quarters of an hour. We looked carefully under the vines and ferns, among the undergrowth in the trees, in fact everywhere for it, even seining a pool of water that had collected in the rocks a little farther below, yet not a sign of the coveted Hoa could we find. I had almost given up all hope of finding it, and began to save the few scattered feathers lying about, feeling that my claim to having found the rare bird would have to rest on such evidence as they could furnish.

As the search grew more hopeless, my native, who had assured me in the morning that he had heard of the Hoa, but had never seen such a bird as I described it to be, now became more earnest, as he declared to me that the bird just shot was not the Oo—the only other black bird known to him. As he was able to give the points wherein it differed from that now almost equally rare species, I felt his remarks were valuable as a convincing commentary on the scarcity of this bird. Here was a native hunter, familiar with the teachings of his fathers, whose knowledge of the forest had been gained almost half a century before, who knew not only the native names and uses of almost every plant we saw, but the names and habits of all the native birds, save this one, declaring it to be unknown to him. Yet we who understand something of Nature's processes, know that the Hoa has been for ages inhabiting these mountains, not six miles distant from, and in sight of the place where this man was born, and where he had lived all his life.

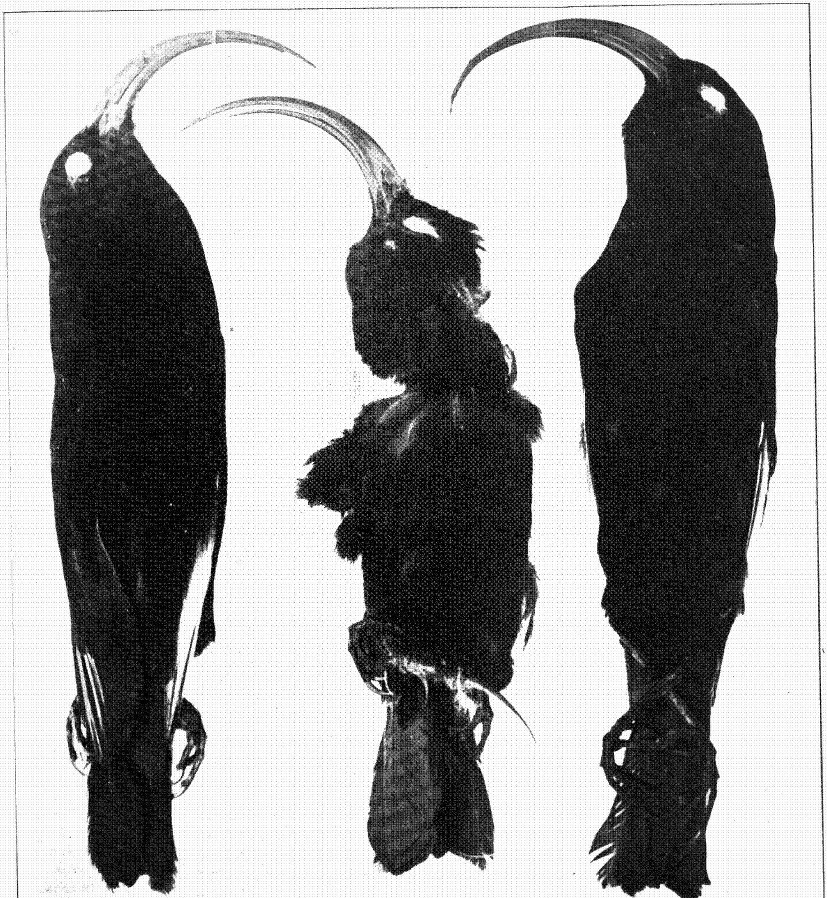
But to return to the search. As a last resort, I climbed up into the tree intending to drop a stone from the place the shot struck the limb the bird had been sitting on, in the hope of locating more acurately the spot where it should have struck the ground. To my joy I found the mangled remains hanging in the tree in a thick bunch of leaves, six feet or more beyond where it had been sitting. It was, as I feared, badly mutilated. However, it was made into a very fair cabinet skin.

Feeling that where one bird had been found others were likely to be, and being elated at the success of the day, I altered my plans so as to extend my stay in the locality. Accordingly, on the third of June, with my guide I packed my range tent and outfit into the mountains and established a new camp in the jungle, at the head of Waialua valley. The country here was so steep and rugged that it was difficult to find a place seven feet square that would do to pitch a tent on. I need hardly add that it rained continuously. The trail was continued along the ridge between Waialua and Honouliwai streams. Early in the afternoon I dismissed my native and continued on the trail alone. I had covered no great distance when under circumstances similar to those already described, I heard the call note "Hoa" again, this time a hundred yards or so in front of me. My best efforts at imitating it seemed to have no effect. I whistled and called and hoped. At first the bird answered my calls, then it failed to respond. I continued whistling until it seemed certain that it must have gone off in some direction, when, without reason or warning, my second Hoa flew and lit in a Kopiko tree, not fifty feet away and began to preen and spread its wings. Catching sight of me it began to work off through the woods. I fired, and this time had no difficulty in picking up a perfect adult male specimen. Though I stayed in in the vicinity for more than an hour nothing was seen or heard of its mate.

The following day found me early in the field. Though there was a steady downpour of cold rain I worked on until three o'clock. Not meeting with anything to encourage me, I climbed up into a tree preparatory to taking a last survey of the country, if there should come a rift in the dense fog clouds. Presently I caught a note entirely different from any I had yet heard. It was a rollicking whistle of five or six clear notes, which I was only partially able to reproduce. The bird, however, came nearer and finally lit in the thick branches of a tree fifty feet or so below me. In my haste to get down out of the tree I was in, some small limbs gave way, and I came clattering down quite a distance before I was able to regain my footing. That the disturbance had frightened the Hoa I felt quite certain, and was therefore agreeably surprised to find that through it all it had not moved from the tree where it had first lit. It seemed to be willing to be studied, an opportunity for which I was exceedingly grateful.

This bird, as well as the two former specimens, confined its range to the undergrowth, several times coming down to within three or four feet of the ground. At no time did it make a long flight or alight on the top of the trees. As it was raining all the while the bird was especially active in preening and shaking its feathers. The trees and vines were everywhere covered with thick wet moss, and although the bird hopped about from branch to branch, carefully inspecting each limb, I did not see it catch any insects, or even probe into the moss. Hopping from tree to tree, it worked its way around the head of the little side valley, up which it had come in answer to my call, to where a large purple-flowered lobelia was in profuse blossom, and began to feed. The ease and grace with which the feat was acomplished was indeed interesting, and left no doubt in my mind as to one of the probable causes of the remarkable development of the tongue and bill. The tongue was inserted with great precision, up to the nostrils, in the flower, while the bird balanced itself on the branches, assuming almost every imaginable attitude in its operations. In all three of the birds secured, the crown was smeared with the sticky purplish white pollen of this lobelia. I had a preconceived idea that the bird would also feed on the flowers of the wild banana. This conjecture I was not able to prove or disprove by my observations, further than that in each case no bananas were to be seen in the valleys below or anywhere in the vicinity where the birds were secured.

The third specimen, like the two preceding it proved to be a male, in perfect plumage. The bodies of the last two and the stomach of the first one—its body being badly mangled— are pre-



DREPANORHAMPHUS FUNEREUS.

served in alcohol for anatomical study. The series of three, so far as coloration, curvature of the beak, etc., are concerned, are identical. Their measurements, carefully taken, are:

No.	Sex.	Length.	Wing.	Tail.	Tarsus.	Toe.	Culmen.	D. of B.
4712	♂	9.35(?)	3.80(?)	3.10	1.20	.90	2.20	.37
4713	♂	9.50	3.90	3.10	1.25	.95	2.10	.37
4714	♂	9.40	3.95	2.95	1.20	.90	2.15	.37

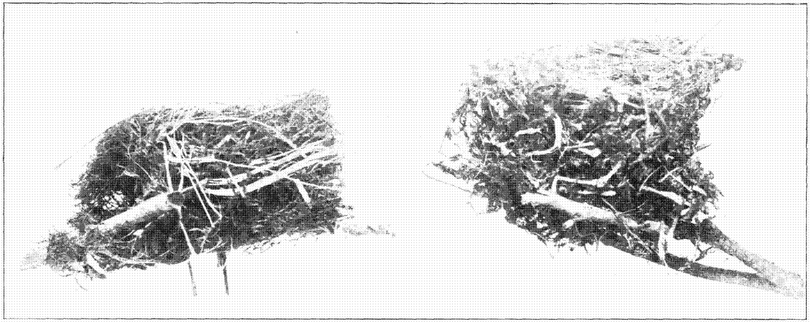
The chord of the largest of the curved tubular flowers of the lobelia on which the birds were feeding, is over two inches in length. After repeated inquiry among the oldest and best informed natives on the island, I was unable to find one who knew or had ever heard of the Black Mamo under the native name "Oo-nukuumu." I did, however, find a few who knew of or identified the bird under the name Hoa.

Vestiaria coccinea Forster.

A series of ten carefully selected birds and three nests of the Iiwi were secured, which in themselves form a valuable set. Taken in connection with the Museum's long series they assume especial interest, making it possible, in another connection, to discuss intelligently from specimens in hand, some of the interesting problems connected with the evolution and development of the species.

Next to the Apapane and Amakihi, the Iiwi is the species most commonly met with on Molokai. They generally frequent the Ohia forests, but occasionally they will extend their range down, in certain seasons and under favorable conditions, as in Wailau and Pelekunu valleys, so as to reach the seashore. They are strong flyers, often mounting high in the air. In small loose flocks they will thus fly from one valley to another. Their flight over the tallest forest trees can be heard and easily distinguished, owing to the whirring noise of their wings, which is supposed to be produced by the peculiar truncated form of the primaries. Other species of the family, as the *Himatione*, having the same shaped primaries produce a similar though less marked whirring sound.

On June 10, while collecting on Wailau pali, I saw a parent bird in the brilliant plumage of the adult, feeding an immature



(4699) VESTIARIA COCCINEA. (4700)

young (Mus. No. 4626). The young bird was sucking the nectar from the Ohia flowers when the parent bird lit beside it. At this the young bird opened its beak to receive the food brought by its parent. The old bird flew away, only to return shortly to repeat the feeding operation. During the time intervening between the attentions of the parent, both old and young birds flew about and fed together. On examining the young bird's crop, several green looper worms were found.

Of the three well identified nests secured, the best specimen was one taken on June 4 from fifteen feet up in a Kawau (*Byronia*) tree, growing on the crest of the ridge well toward the top of Puu Ohelo Mountain. Although it was unoccupied it had every appearance of having been used in rearing a brood. Scarlet feathers from the breast of the parent bird found in the nest left no doubt of its identity, while from the tree the nest was in I shot a very young Iiwi, that presumably had but recently left the nest near by.

The nest (Mus. No. 4699) is mounted on a horizontal fork, and externally is 4.50 inches across by 2.75 inches deep. The bowl is 2.50 inches in diameter by 1.50 deep. Externally the structure is composed of the moss so common on the trees in the higher altitudes. Into this has been worked a few sticks and some fibre from the dead leaves of the Ieie vine. The inner lining is made almost entirely of the black hair-like fibres of dead moss. Generally speaking it is a very neat and compact structure.

The second nest (Mus. No. 4701) does not differ much from the one just described. In size it is a trifle larger, and was located in a terminal vertical fork of an Ohia tree. The material, especially the moss, is coarser than in the nest described.

The third nest (Mus. No. 4700) was not quite completed when collected on May 25 from the thick forests at Halawa. Like the last, it was placed in an Ohia ten feet or more from the ground. Wanting the lining, as it does, it might be mistaken as the completed nest of some other species as the Ieie fibres used in its construction make a very creditable lining. But a close examination of the size, shape and material used, so far as completed, shows it to be substantially the same as the first described. However, the moss is of a different species and a more liberal use is made of small twigs in the foundation, while as just said, Ieie leaf fibre enters extensively into the secondary lining. Only a few of the blackish moss stem fibres mentioned above, have been put in place, while two or three small wisps of pulu fibre have been woven into the brim. The eggs of the Iiwi are as yet undescribed.

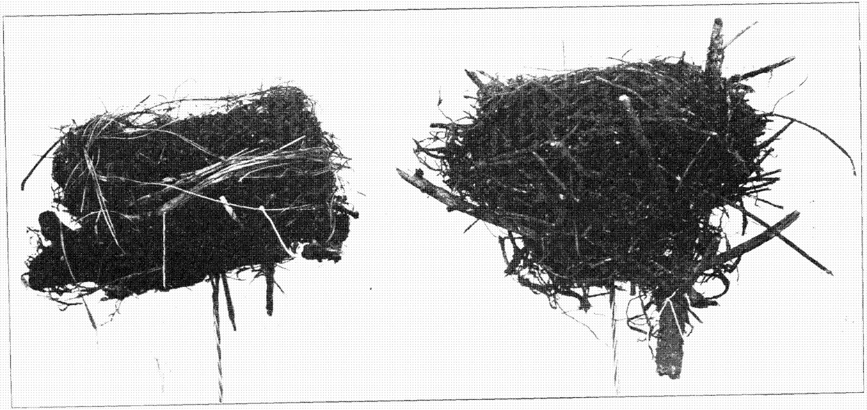
Palmeria dolei (Wilson).

I was unfortunate in not securing this species, though five individuals were seen in one flock at one time, and three at another, flying out over the pali at the head of Pelekunu valley. It was not seen or heard elsewhere. Mr. Munro, who immediately preceded me in the same woods, did not see the species at all during his month's work about Puualu Mountain. We therefore feel assured that though the bird is still to be had on Molokai, it is by no means as abundant as one might conclude from reading Mr. Perkins' account, published some years ago, where he records that he "assembled a flock of no less than nine adult birds at the same time in one small Ohia tree."

Himatione sanguinea (Gmel.).

The Apapane is the most abundant species on Molokai. A short series was taken for comparison with the Museum's material, which has been collected at the same season on the other islands of the group. The song and general habits have already been fully recorded elsewhere. However, certain observations concerning the mating performance seem to be new. During the early part of our stay the Apapane were in the height of the mating season. The song of both sexes was frequent and varied. Quarrels between the contesting males were of common occurrence, and were often apparently extended into feuds. During the excitement of the mating period either sex is easily decoyed by imitating the notes of the opposite sex. The love dance described elsewhere (Oc. P. B. P. B. Mus., vol. i, no. 2, p. 43) in the series of notes was repeatedly witnessed. In addition to the fluttering dance there described, on one occasion I saw it carried to the extent of the male bird affiectionately caressing its mate with the beak. The whole performance lasted several minutes.

The high palis of the island furnished an excellent opportunity to observe the Apapane in sustained flight. Flocks of seven



VESTIARIA COCCINEA. (4699)

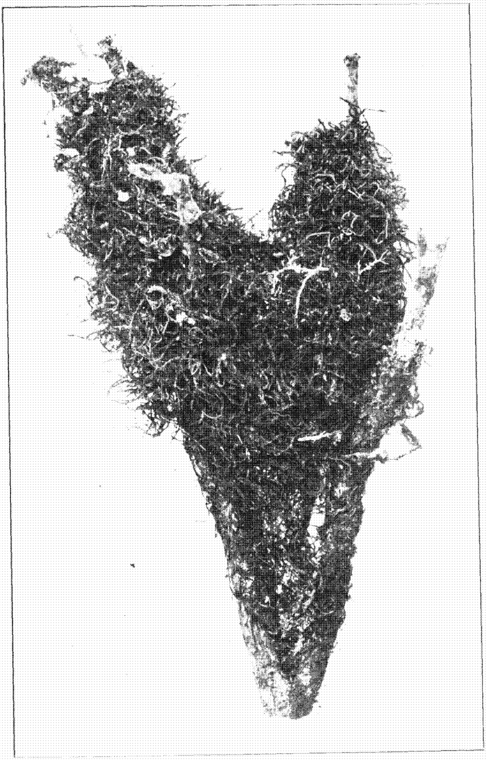
r eight or ten will, not infrequently, fly from the forests at the dge of these precipices, thousands of feet above the valley below, nd with little concern, steer a course that will take them in a irect line as far as the eye can follow them. At nightfall they are o be seen returning from their feeding grounds lower down on the ountains or in the valleys flying swiftly and directly in the higher ltitudes to roost. This daily migration over open land or from lace to place is a very strongly marked characteristic of this bird.

A number of nests—but unfortunately no eggs—were secured. am convinced that the nesting season cannot be well defined. n substantiation of this opinion, I find that in the series of skins ollected, two are immature, while perhaps five times that number f brownish-colored young were noted among the hundreds of dults seen at close range. This fact, coupled with the mating erformances and the enlarged testes and ovaries examined, would ndicate that on this island, at least, an occasional late brood is eared.

The series of eight nests do not vary in material or location rom those elsewhere described, to a degree sufficient to warrant heir redescription. However, a deserted nest (Mus. No. 4683) aken from twenty feet up in a moss-covered Ohia tree which was rowing in the heart of the Puualu forest, is somewhat extraordi- ary in that it has returned to the original elements of which it vas composed *in situ*, leaving a replica of itself in living green noss. The structure is of some years standing evidently. Old nough at least, so that the moss and sticks of which it was com- osed have had time to almost completely disintegrate. That ortion which remains has, in the meantime, become completely overed with living moss, so that the shape and general appear- nce of the nest is retained with just enough of the old structure emaining to account for its form and history.

Chlorodrepanis kalaana (Wilson).

Without here entering into a discussion of the very minute haracters that have been used to separate this species from the ery closely allied forms from Maui, Kauai and Oahu, it will be ufficient to say that the series of seventeen birds secured on Molo- ai, confirm rather than disprove the conclusions formerly arrived

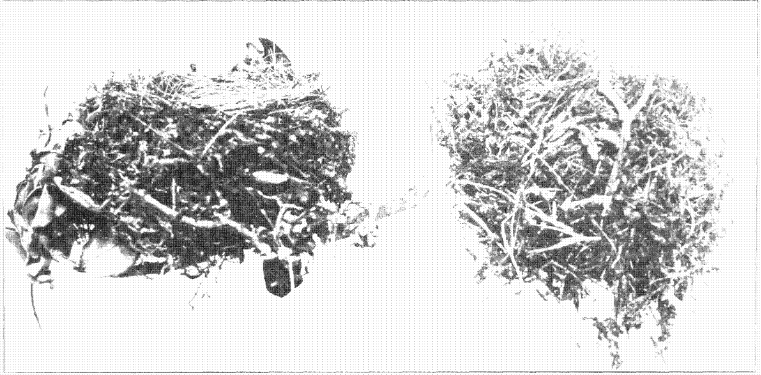


HIMATIONE SANGUINEA. (4683)

at—namely: that *kalaana* has been separated as a species on characters that are of doubtful sub-specific value. Was it not for the definite geographical factor which enters in for consideration, the form would hardly have impressed the original describer as being worthy of designation as a sub-species.

The Amakihi is the second species in abundance on the island, and was met with throughout the forested districts generally, often coming well down to the coast line on the weather side of the island, where conditions are favorable. The species is sociable by nature, usually feeding in small companies or at least, never singly. Their call note is a fine clearly whistled "Tse-et." This is usually given when for any reason an individual becomes detached from the flock or separated by any distance from its mate. The call note, as with most all the mountain birds, is given more frequently during foggy, cloudy weather, for obvious reasons. They are sure to be found where sunny slopes covered with open woods are interspersed with plenty of bushes and low shrubs. In such situations, if food is abundant, they become fairly established in their habits, often feeding over the same range a number of times each day. Their song on such occasions is usually frequent and identical, I believe, for both sexes. It consists simply of a repetition of "Ts-chee-chee-chee-chee-chee-chee", trilled without variation, in a surprisingly loud and penetrating voice, which always impresses one as being forced and metallic in quality.

Though generally favoring woods of the character described, they are to be met with in all sorts of places. I have found them —usually in isolated pairs, it is true—in the darkest and wettest parts of the forests, where flowers were almost wholly wanting. In such places they were feeding on the limbs and leaves of the trees high over head. At other times, they are plentiful on the low bushes growing on the sharp, and more or less dry and barren ridges. Or again, they will be met with on the outskirts of the forest feeding on the flowers and leaves of whatever species of tree or shrub was at hand, not even shunning the introduced species, as Lantana and Guava, which crowd well into the edge of the forests in some places. In their feeding, however, there is a preference shown for the Ohia both in and out of flower. Lobelias, especially the flowers, were seldom visited. But the white bloom,



(4663) CHLORODREPANIS KALAANA. (4698)

as well as the leaves, of the Scævola, were always carefully inspected by them.

The nests of this species, of which three fine specimens were collected, are so similar *inter se* as to be easily distinguished from nests of the other species on the island. Still they differ considerably, especially in the materials used, from others of the same genus now in the Museum collection. The most definitely identified, and best constructed nest (Mus. No. 4696) is one taken May 27, about half way down the Pelekunu pali. It was built in a stunted Ohia tree beside the trail and was poorly, if at all, concealed. It was placed on a horizontal limb fifteen feet from the ground, which brought it on a level with the path on the crest of the ridge. Its external dimensions are 5.00 inches across by 2.25 inches in depth. The bowl is 2.25 inches across by 1.25 inches in depth. Externally, the structure is loosely woven from green moss. Into this as a secondary lining, is worked some brown fibrous material of the color of pulu but resembling closely the soft inner bark of the Ohia. The lining proper is a generous one, composed entirely of the fibre of the dead leaves of the Ieie. The nest is a well woven compact structure. When first taken it was strongly scented by the peculiar drepanine odor, a trace of which still clings to it. Though no eggs were in the nest the parent bird was on when it was discovered.

A second nest, taken at Halawa May 24, is a sort of concession to civilization, being placed in the upright fork of a Lantana bush that was growing among the Ohia trees, a considerable distance into the forest. It is substantially the same as the one just described though not of as high order of workmanship.

Oreomystis flammea (Wilson).

Of this species an excellent select series was collected which shows the various stages through which the birds of both sexes go before attaining their adult plumage. In the field the flame-red males are in a decided minority, occurring in the ratio of about one in nine. But in my series of study specimens, they are in the ratio of one to three. This is owing to the tendency in the field to take the bright colored bird, and not (as might erroneously be concluded) because they are easier to obtain than the females or immature. The fully adult male at this season is usually accompanied by the female and from two to four parti-colored immature birds of both sexes. Occasionally young birds that have assumed more than three-fourths of the red plumage of the adult will be found in such companies. On the other hand one is rather more apt to find pairs mated and settled before the male has assumed one-third of the conspicuous red plumage to which he is heir.

In habits the Kakawahia resembles the species of the genus to which it belongs, and from which it differs in color so widely. They prefer to feed over the trunks and branches of the trees. Here they secure the insects that make up almost the whole of their diet. However, they will be seen in the tops of the tallest trees, but apparently paying little or no attention to their flowers. In short, they are persistent and sturdy entomologists, always active and alert, but strange to say, they seldom, if ever, take insects on the wing. At intervals moths are taken of such size they are compelled to hold them under their feet and pull them to pieces so as to devour them piecemeal, much after the fashion of the common chickadee.

When they have once settled on a home in the forest they at once set about to establish their sphere of influence, over which they rule, so far as possible, to the exclusion of every trespasser. On the approach of some intruder, as a man or a dog, they will both set up a scolding "Chirk, chirk", that is no uncertain sound to one familiar with birds' voices and ways. If the alarm chirk is continued long enough, the nearest neighbors are rarely so far away that they will not come in to satisfy their natural curiosity and add the weight of their presence and voice to the protest.

The Kakawahia, like his cousins, is full of curiosity. The sound of one making one's way through the woods is sure to attract the little resident to the scene, when uttering their never-varied "chirk", they will come close enough to the person to take in every detail of his makeup in wide-eyed inquisitiveness. Once satisfied that their show of authority has no intimidating effect, they will resume their feeding close to the observer. One can thus study their movements at close range. I have often watched them under the most favorable circumstances, for an hour or more at a time, but have never seen them paying the slightest attention to the nectar-bearing flowers about them. Occasionally they go down in the shrubs to within a foot or so of the ground, and it is probable that on rare occasions they do alight on the ground, although I have never seen them do so.

A good series of fairly well identified nests was taken, but the eggs were not secured and remain as yet unknown. The best specimen (Mus. No. 4691) was secured in the middle of the Halawa forest on May 27. I had climbed into an Ohia tree to take a survey of the surrounding country, when my attention was attracted by the disturbance being made by a fine red male Kakawahia, accompanied by its mate and three immature birds. They came up close to me and were loud and determined in their "chirks". Looking about for the cause, I found it in the shape of a nest but a few feet from me. It appeared to be just completed. It is made up of moss neatly woven together, and measures 4.00 inches in diameter by 2.75 inches deep. The interior is lined with the blackish root-like stems of dead moss and a few fibres from disintegrated Ieie leaves. The bowl is just over 2.00 inches across by 1.50 inches deep. A horizontal fork of an Ohia limb some fifteen feet from the ground has been used as the site.

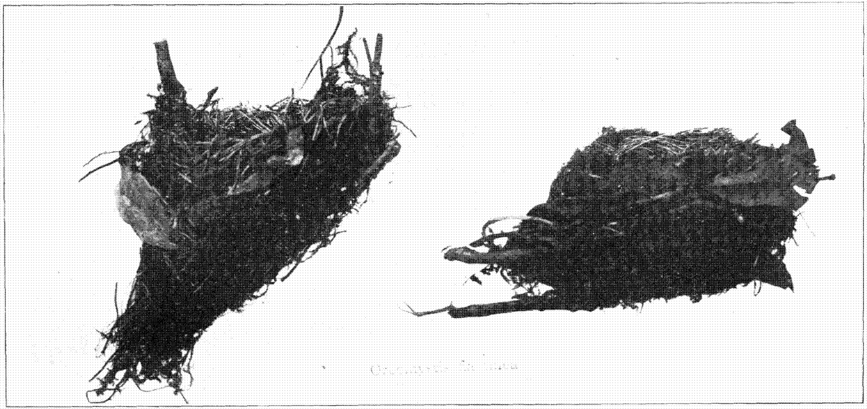
I conclude that the young birds following the adults were from a late brood of the year before, and doubtless would themselves not breed until the following fall or spring; though one of the young was well advanced in assuming the plumage of the adult.

The second nest (Mus. No. 4694) was also taken from an Ohia tree. It was collected at Mapulehu June 9, and is in every way similar to No. 4691, except that it was placed in an upright crotch.

A third nest, in an unfinished condition, was taken on Kilohana in the wet forest on April 30. The old bird was seen carrying the moss of which the exterior is composed. The site was an upright fork of a small Kawau tree about eight feet from the ground.

Psittirostra psittacea (Gmel.).

It is my intention in a separate paper to discuss at some length the Museum's choice series of almost a hundred skins of the Ou that have been collected on the large islands of the group. It is felt that certain questions that have been raised concerning this interesting genus can then be cleared up. For the present it is



(4694) OREOMYSTIS FLAMMEA. (4691)

sufficient to say that sixteen skins of both sexes, adult and immature, were secured on Molokai during April, May and June.

The Ou was met with at all the stations visited in the forest area, in a ratio of about one to twenty, as compared with the Amakihi. Hence it is not, relatively speaking, the abundant species its size and song would seem to make it, especially when compared with the much smaller and more obscurely colored *Chlorodrepanis*.

The Halawa forest makes an ideal home for this Ieie-loving bird, since that region, as has elsewhere been mentioned, is a perfect tangle of this vine. Along the streams patches of wild banana are also common, while Olona (*Touchardia*), another food plant of the species, is met with everywhere in suitable places. As Ieie has apparently had much to do in the evolution of its peculiar beak, the Ou commonly frequents the forests where it is most abundant. It is, nevertheless, always to be found in the more dense Ohia forests, even though the amount of Ieie is small, or wanting entirely. In the heavily wooded localities, it feeds through the tops of the trees, seldom coming near the ground. At such times there are usually several birds in the locality scattered about in scout formation. They seem rarely to alight together in the same tree, yet they always keep within easy call of each other. The inquiringly whistled call note "Psweet" is frequently given, and answered by birds thus deployed, especially during cloudy weather. If the call is imitated the bird will readily respond a number of times in succession, often cautiously approaching the observer to satisfy its curiosity. The young birds are much easier decoyed in this way than are the more experienced adults. It is not uncommon to have the green inconspicuously colored birds answer one from a tree near at hand, several minutes before its whereabouts can be determined. A number of times during drenching rains, I have heard the call note plaintively given, and after protracted search have found the bird standing motionless in a very dejected attitude, huddled close against a tree trunk, or stowed away in a thick bunch of leaves for shelter.

Of its musical powers much has been written, as it has been quite commonly given first place among the singing Drepanididæ. The song—which, by the way, it rarely gives in its entirety—is especially sweet and pleasing, resembling in many respects that of the canary. Perhaps the favorite place for delivering its song is from the topmost branch of some dead Ohia tree, standing in an opening in the dense surrounding forest. From such a station it will often sing intermittently for an hour or more. It is liable at any time to disappear in the woods, only to return presently to take up its song again.

The adult male is, by reason of its golden yellow head, a conspicuous bird, but with the head has been supplied a large amount of caution which results in it being much rarer in collections than would otherwise be the case. The female and the immature of both sexes are inconspicuously colored, and for that reason are often passed by the collector unobserved. As is so often the case, owing to the curiosity and want of fear in the young, more immature than adult birds are always collected.

The flight of the Ou is rapid, heavy and direct. During their more extended flights, as from one ridge to another, they are more often than otherwise in small flocks. Birds of both sexes answer a decoy whistle frequently, coming within easy range of one, eyeing the intruder narrowly all the while. A sudden motion, or an unusual noise will invariably put the bird to flight, when they will dart off without further ado, not infrequently flying half a mile or more in a direct line. Like the Apapane, I have observed the Ou making long-sustained flights from the palis of the large valleys, that carried them readily from one valley to another. At such times they rarely, if ever, soar or circle about, but set off directly for the fresher fields with a show of knowledge and determination that makes them while on the wing, easily distinguished from their neighbors, as far as they can be seen.

The series of skins give the following maximum, minimum and average measurements:

FOUR ADULT MALES.

	Length	Wing	Tail	Tarsus	Toe	Culmen
Minimum ·······	7.00	3.50	2.20	87	90	60
Average ·········	7.06	3.70	2.24	90	97	60
Maximum ·······	7.25	3.80	2.40	92	1.05	60

FIVE FEMALES.

Minimum ····· ·	6.75	3.50	2.10	87	95	60
Average ·········	7.00	3.61	2.22	90	95	60
Maximum ·······	7.25	3.70	2.40	92	95	60

FOUR IMMATURE.

Minimum ·······	6.70	3.50	2.15	..	..	..
Average ·········	6.92	3.59	2.20	..	95	60
Maximum ·······	7.10	3.65	2.40	..	..	..

It is remarkable that the nesting habits of this bird, which has in times past been common on all the islands of the group and has been so generally collected and studied, should as yet remain entirely unknown.

Moho bishopi (Roths.).

After two months in the forest of the island, I have no hesitancy in pronouncing the Bishop Oo a very rare bird. During that time not a specimen was secured, nor was I able to hear so much as a sound that could be even attributed to it. This is the more remarkable since we know that its characteristic call can be heard in the forests, especially in the more favorable districts—as at the heads of the great valleys mentioned—for a half mile or more.

My disappointment at not securing this species was most keen. However, as the Museum received but three imperfect specimens as its third share of the collection made by Mr. Perkins, I feel sure the species was at that time (September and August, 1893) by no means common. Since the above date it has certainly very appreciably decreased in numbers, as Mr. Munro and I are ready to testify. The requirements of the Museum's exhibition and study series, no less than my desire to see and study the bird alive, nerved me to put forth every effort to discover its whereabouts. No pains were spared in making a thorough examination of every locality suited to its habits, as well as every place where it had been merely reported as having been seen in recent times. As a result, the wildest and most difficult parts of the island forests were visited, not once, but repeatedly. On several occasions a night or more was spent, sleeping in the open, in the centre of promising localities not to be reached otherwise, in the hope of hearing, if possible, the call of the Oo either in the late afternoon or early morning. Feeding grounds where the bird was reported to have been seen "in small flocks" a few months before, were revisited, usually accompanied by the persons reporting the observation, with the uniformly discouraging result. Virgin forest, unfrequented by man or beast, was traversed to no avail. Many hours were spent in silently watching and listening in places, where according to the oldest natives and even those of the present generation, birds were formerly to be met with, almost always on even the most casual day's ramble in the woods. Its feeding grounds among the

Ohia, the bananas and the lobelias were regularly visited. The deep gloomy woods, the bright forested ridges, the secluded valleys were explored from end to end of its habitat, all without seeing so much as a single sign of the bird to encourage one to further effort.

Nevertheless, since the present species, as well as its cousins on Kauai and Hawaii are known to be gregarious and nomadic at certain seasons, it may be that such habits account for its occasional appearance, and more frequent complete disappearance in certain sections. However that may be, of the fact that the Oo is a rare—indeed an exceedingly rare bird, there seems little question. As to its being already extinct, I am not yet convinced, but that it is very near the verge of extermination, cannot longer be doubted by any one.

Phæornis rutha, new species.

Type Specimens. Male: B. P. Bishop Museum No. 4631; Kilohana Mountain, Molokai; April 30, 1907; W. A. Bryan. Female: B. B. Bishop Museum No. 4632; Puualu Mountain, Molokai; April 22, 1907; W. A. Bryan. Immature Male: B. P. Bishop Museum No. 4628; Halawa, Molokai; May 25, 1907; W. A. Bryan.

Habitat. Forest area of the island of Molokai only.

Specific Characters. Similar to *lanaiensis* but with the throat and breast much grayer; abdomen and under tail coverts whiter; back darker olive-brown; size uniformly a trifle larger; bill averaging longer and slightly broader.

Diagnostic Characters. Uniform in color; above brown or hair-brown with an olive wash; with no conspicuous markings on the outer tail feathers; size larger, length (in the flesh) 8.25–8.40, wing 3.67–3.80, tail 3.10–3.25; darker above in adult and immature, and without any rusty gray cast on the crown and mantle. Grayer on the throat and breast.

Description of Type. Adult Male: Above inconspicuous dull brown with dusky olive tinge; head darker colored than the mantle. The grayish wash of *lanaiensis* over the head and rump wanting even in moulting birds. Outer webs of the inner primaries and most of the secondaries with a blackish patch at their bases, which is bordered before with a rusty brown patch; centre tail feathers like the back; outer pair paler on their outer webs on the basal portion, but not conspicuously so. Lores blackish and gray, grayest on the breast and palest on the throat; sides of the body like the breast. Flanks and thighs rusty olive. Centre of the abdomen clear white; under tail coverts ranging from pale buffy cream to white; bill black, iris brown; feet and tarsus dark brown; soles pale yellow in life. Length 8.25 (8.31)–8.40, wing 3.67 (3.73)–3.80, tail 3.10 (3.17)–3.25, tarsus 1.22, toe 1.00, culmen .72.

Adult Female: Similar to the male in color. Length 8.40, wing 3.70 (3.72)–3.75, tail 3.05 (3.09)–3.12, culmen .70.

Immature Male: Similar to young *lanaiensis*, but much darker and less rusty olive over the back; under parts uniformly grayer; wings and tail longer. Length 8.00, wing 3.65 (3.69)–3.75, tail 3.05 (3.11)–3.15, culmen .71.

When studying the material preparatory to writing my Key to the Hawaiian Birds, in 1899, I was convinced that the Molokai form would prove distinct from the Lanai form. Since then as the Museum's series of specimens from the two islands has increased, evidence has accumulated all tending to substantiate the premise there expressed (Memoir B. P. Bishop Museum, vol. i, p. 311) until now, with the additional series of twenty carefully sexed birds in the collection just made, there is no reason for hesitating longer in separating these two closely allied forms. This I have done, naming the Molokai Olomao in memory of my wife.

That the species from the two islands are very similar is not surprising, since the islands are only a few miles apart. Yet the conclusion which has been generally accepted, namely, that the birds from both islands cross the channel with sufficient frequency and regularity to keep the individuals of both habitats uniform, receives a serious rebuttal when we consider that neither Lanai nor Molokai has, to our knowledge, sent out settlers to the nearby and larger islands of Maui and Oahu, in sufficient numbers, if at all, to in the least way prevent the genus from disappearing entirely from the last mentioned islands, while they have continued to remain common on both Lanai and Molokai. A sufficient cause for their not throwing out stragglers or regular settlers is perfectly apparent when a close study of the genus is made in the field.

As is well known, all the species of *Phæornis* are highly sylvan, rarely leaving the deeper woods. Or, if occasionally inhabiting the more open parts of the woods, they are always of settled habits, frequenting the same sections throughout the year. They never seem to range very far from any particular locality where they have taken up a residence. If they do go afield, it is always by short covered flights. For the Olomao is by nature a shy, timid bird, and for that reason, instead of exposing itself in the open it prefers to proceed from place to place by short low flights, usually through the shade of the forest. Again, a flock of Olomao, even a flock in the most restricted sense, has, I believe, never been seen. When they rove about at all they are alone, or at most in pairs. In my experience with the genus on Kauai, Molokai and Hawaii, I have never seen them high up in the air, and sustain a flight of any distance above the tree tops. Their buoyant spirit not infrequently lifts them into the air in a prolonged burst of song, but when they have finished the effort they drop back into cover and if so minded, work off through the trees to some other favorite retreat. In marked contrast with the habits of the wide-ranging Apapane or Iiwi, I have never witnessed a bold flight of even a solitary individual from the high forest-clad palis where it abounds.

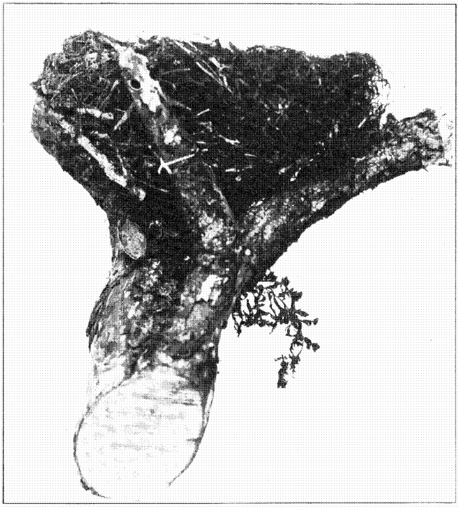
It would be perfectly possible physically for the Olomao to readily pass back and forth from Molokai to Lanai, or to Maui, or Oahu, so far as the inter-island distances and its power of flight are concerned. But I am convinced that its habits are such that it does not venture voluntarily on such flghts. Furthermore, by rarely exposing itself in the open or getting far from cover, it reduces the possibility of such migrations being accidentally made through the agencies of wind and weather to the minimum. Hence it is highly probable that the inter-island migration and breeding of sufficient numbers of the two forms to influence the mass of individuals on both islands sufficiently to keep them breeding to type does not occur.

The general habits of the Molokai species coincide very closely with those of the other species of the genus. Berries are by far its commonest food. While insects were found in the stomachs of a part of the birds examined, they occurred in no considerable quantity in any of them. Several times I came on the birds feeding on berries and had an opportunity to watch their behavior at close range unobserved. It was thus possible for me to settle some minor points as to their behavior, particularly as to the cause of the peculiar trembling motion of the wings which has been attributed by one or two authors to fear alone.

A bird under close observation flew down to feed on the drupes of a small Olapa (*Cheirodendron*). After a few moments it flew up into a nearby tree, when after deliberately cleaning its bill it broke forth into its fullest song. Pausing as if to study the effect, or to see if the melody would be taken up by its neighbors, it would tremble the wings and hop idly about from branch to branch. This program was repeated many times, singing, feeding, and fluttering its wings alternatively. It is true that the quivering is more often resorted to under the stress of excitement, but it is equally certain that it is indulged in at other times quite naturally and frequently.

As to the song of the Olomao little can be added to the excellent accounts already in print. No one is able to see the singer or hear its song without being impressed by its thrush-like character. The effort is more usually delivered from the topmost branches of some favorite tree; although it is to be found frequently singing joyously in the underbrush. When singing the head is always thrown well back, the throat full and free, and the wings and tail are invariably relaxed and drooping. The irregular, at times, somewhat jerky, though always melodious song is given not once or twice, but often dozens of times. Once heard its character will live in the memory for years, though its component parts are wholly inimitable.

Not only does the Olomao sing early and late, but in fine weather I have heard it far into the night. One of the peculiarities of the song is its ventriloquistic character. A bird may be singing volubly in a tree not twenty yards away, and so varied in volume and timbre are the notes as the song increases from its beginning of a few low chirping notes to the zenith of its power and beauty, that even an experienced observer is at times at a loss to locate the songster. In truth it seems that the whole tree might be full of song. The voice comes from the centre, from the right, from the left, from the back and from the top of the tree successively or simultaneously, seemingly at the pleasure of the musician. So marked is this power that a bird in plain sight may sing a half dozen times before the sombre-colored piper will be discovered. In addition to the song the Olomao has a number of notes and



NEST OF PHÆORNIS RUTHA. (4710)

calls. One which is very puzzling, especially to the natives, is a cat-like cry which is given in an inquiring intonation from some hiding place in the undergrowth.

The species was more abundant at Halawa than at any of the other localities visited. This was doubtless due to the seclusion afforded by the untrodden forests of that section. A few immature birds were taken, but the majority of those seen were, in the fully adult plumage. The length of time required for the young to acquire the adult plumage is apparently more than one year.

On May 1 I took from thirty feet up in an Ohia tree growing in the dense woods on the summit of Puualu, a nest which I have no hesitancy in referring to this species. In the locality was a pair of resident Olomao, evidently the owners of the nest (Mus. No. 4710) here described. Externally it is over 6.00 inches in diameter by 3.50 inches deep. Small dead Ohia twigs form the foundation of the structure. Into this is placed a generous lining of moss and fine rootlets neatly woven together to form a substantial thrush-like nest. The hollow of the nest is 3.50 inches across by 1.50 inches in depth. The nest has evidently been used and deserted, though unmistakably of recent construction. It is singular that as yet nothing is known of the egg of any of the species of the genus, save the reference by Henshaw (Birds of the Hawaiian Islands, p. 31) to the finding of a small fragment of an egg shell in the stomach of a Hawaiian Hawk (*Buteo solitarius*) which he suggests might be a portion of an egg of *Phæornis obscura* of Hawaii.

It seems worth while recording that an old native who accompanied me on my Moanui trip said that he had heard from his father "that a long time ago there was on Molokai a small brown bird that ran on the ground but could not fly," but that they had all been dead for a long time. He gave its name as Moho (*Pennula*). He also said that his father had told him of the Elepaio (*Chasiempis*) being on Molokai in the olden time. Mr. Theodore Meyer substantiated this report by saing that when he was a boy it was generally known to the old natives that both the Moho and Elepaio had been plentiful, but that they had long ago died out.

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